

**AGENDA**  
For  
**UNIVERSITY GRADUATE COUNCIL**

Monday, March 18, 2013

3:15 p.m.

114 Sherrick Hall

Approval of Minutes of Feb. 25, 2013

Open Campus Forum – Comments from campus visitors

PhD in Materials Science proposal – John Neumeier (Physics), Rob Walker (Chemistry and Biochemistry), Robert Mokwa (Civil Engineering) handouts

- Presentation followed by question/answer session

MS of ARCH– Steven Jurosek (Interim Director) handouts

- Presentation of proposed curriculum changes beginning Fall 2014

Policy Review – Amanda Brown

- Interpretation of 9 cr limit of 4xx level courses as applied to Doctoral programs. Consideration needs to be reviewed for student who are pursuing PhD with MS and are only required to take 21 cr.
- Current policy notes:  
*4. 4XX level courses may be used on a Program of Study: a maximum of 9 credits are allowed.*

Next meeting April, 15 3:17 pm – 5pm (last one for the semester)

6 March 2013

Dr. Martha Potvin, Provost  
Dr. Ron Larsen, Associate Provost, Academic Affairs  
Dr. Nicholas Ward, Chair, University Council

**Subject: Materials Science PhD Proposal — Review Comments by the Academic Programs Working Group**

Dear Dr. Potvin, Dr. Larsen and Dr. Ward;

The Academic Programs Working Group met on 26 February 2013 to discuss the revised proposal for a PhD program in Materials Science. This revised proposal has been modified and updated. It now provides more details and specifics in regards to curricula and the administration of this cross-campus collaborative program. However, we believe that some of the concerns mentioned in our previous review letter dated 22 August 2012 and concerns mentioned in the AAAS review report dated August 2012 are still relevant and have not been sufficiently addressed by the revised proposal.

**Program Strengths**

Some of the Program strengths identified by our committee are described below.

A-1) The committee supports the concept of MSU-Bozeman offering a PhD in Materials Science. A PhD in Material Sciences furthers the mission of MSU as a land grant university committed to offering the highest quality education and training for students in the sciences and engineering fields.

A-2) The Program will meet the needs of future students desiring a degree in a rapidly growing highly technical field with a global demand for materials scientists and materials engineers.

A-3) The Program will provide highly trained graduates to fulfill needs that have been identified by employers and industry in Montana; there is currently no doctoral program of this type in the state or intermountain region

A-4) The Program fulfills objectives in MSU's strategic mission including increasing the number of doctoral degrees awarded and it will also increase the number of faculty PhD mentors in STEM areas.

A-5) The Program its collaborative and bridges not only different Departments and Colleges, but also different campuses in the MUS system. While each campus has its own strengths; a move toward a collaborative framework is applauded, especially for training students at the PhD level. For

John Neumeier, Chair  
Robert Mokwa, Chair-elect

MSU Faculty Senate

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example, this type of effort reflects the goals of Montana EPSCoR to bring the different campuses within the MUS system together.

A-6) The Program will bring additional resources to the three universities and will consequently enhance the local economies in Bozeman, Butte and Missoula.

### **Concerns and Weaknesses**

B-1) Faculty have strong concerns regarding overall startup costs for launching this program; especially considering the logistics of the three-campus approach that is described in the proposal.

B-2) This joint undertaking between the three campuses offers some system-wide benefits and assets in terms of collaborations and sharing of resources, including specialty labs and equipment; however, the three-campus approach adds layers of administrative complexity that are not fully spelled out in the proposal. In many respects, how such a three-campus collaboration will work is left undefined. These include: how indirect costs will be addressed, the three-campus concept may be confusing to prospective students, the requirement of nine credit hours off campus may pose an extra (unnecessary) burden to students, and many additional institutional differences and standards exist between the three campuses that will complicate this offering and result in additional expenses.

B-3) The Program will add additional administrative burdens to departments that are already heavily taxed and understaffed. In addition, the proposal is unclear and confusing in terms of how an individual department on one of the campuses will actually grant this PhD, and which department will house the Program.

B-4) UM and MTech would require significant increases in resources to initiate a materials science program on their campuses. The resource needs would be significant and include several new faculty lines at each campus; laboratory and research space for faculty and students; and new faculty startup funds, which could be as much as \$500,000 per new faculty hire. The analysis of resource needs and projected revenue evaluation in the proposal (Table 3, page 21) was confusing and did not appear to be complete. In addition, the resource analysis does not adequately address all the resource issues that will be necessary to build and sustain a successful Program. (For example, administration costs, human resources, space, library holdings, equipment, startup funds for new faculty hires, to name a few.)

B-5) The proposal calls for additional faculty on all three campuses. However, there will be a need not only for additional materials science faculty but additional ancillary faculty to address workload shortages caused by the redirection of existing faculty into this new Program. Existing faculty called on to teach new materials science courses will not be available to teach other courses in their respective departments. The proposal lacks details on how this need will be met, both in terms of faculty lines and supporting resources.

B-6) The issues addressed herein bring into question whether MTech should even be able to offer a PhD degree. (This defines a University versus a College; i.e., the ability to grant advanced degrees.) This is important because, for instance, the current typical teaching load at MTech will

make it very difficult for faculty to mentor PhD students. The proposal calls for reduced teaching loads for faculty involved in training PhD students, but this may very well set up a division between faculty on that campus, with some faculty designated “teaching faculty” and others designated “researching or mentoring faculty.” We believe all these questions should be teased out before any Program is adopted.

B-7) MSU has the faculty, staff, facilities, laboratories, infrastructure, library resources, almost everything that is needed for this program to succeed. MSU will carry the brunt of the responsibilities for ensuring this program is successful. This is not spelled out sufficiently in the present document. Careful consideration should be given to who exactly will be leading the effort and what additional resources will be needed.

B-8) The delivery of courses is inadequately addressed. Will the core courses be offered on all campuses? Will there be online versions of all courses? If not, which ones will have online versions? Faculty who have to simultaneously present face-to-face and online versions may, in effect, end up teaching two different courses in terms of workload requirements. How will this be addressed?

In summary, the committee supports the creation of a Materials Science Doctoral program in the MUS system. However, we have some concerns, especially related to the significant cost the program will require for startup and long-term stability. We recommend that items B-1 through B-8 described in this letter be addressed by the proposal team prior to advancing this proposal beyond the university review level.

Please contact me if you would like to discuss these review comments in more detail.

Sincerely,



Dr. Robert Mokwa  
Chair, Academic Affairs Committee

Representing Academic Affairs Committee Members:

Dr. Steve Cherry

Dr. Doug Downs

Dr. Robin Gerlach

Dr. Michael Reidy

Mr. Richard Wojtowicz

School of Architecture - Montana State University

## Master of Architecture

### Proposed Curriculum Changes

February 25, 2013

#### Proposed Change to Master of Architecture (M.Arch) Graduate Program

Course changes are being proposed to the existing 42-credit Master of Architecture curriculum. These changes include:

- Replacing two graduate electives with two required graduate courses
- Creating a new graduate design studio course to replace one of our current graduate design studios
- A new research course, ARCH 575, would replace our existing research methods course, ARC 552.
- The existing sequence of graduate design studio courses would also be changed.
- Assigning new rubrics to three existing graduate electives
- Finally, we will require that students entering our graduate program have completed 126 undergraduate credits prior to entering our graduate program in order to meet the minimum combined total of 168 undergraduate and graduate credits required by the National Architectural Accrediting Board (NAAB).

#### Timeframe of Change

This proposed change would take place beginning Fall 2014.

#### Parallel Changes to the Undergraduate Environmental Design Program

In conjunction with the proposed changes to the Master of Architecture program, the School of Architecture has submitted a proposed change to the Bachelor of Arts in Environmental Design undergraduate program.

- This change would increase the credits required for a Bachelor of Arts in Environmental Design undergraduate degree from 120 credits to 126 credits.
- The reason for the change in undergraduate credits is to meet the new minimum 168-credit requirements mandated by the National Architectural Accrediting Board (NAAB) for the combination of undergraduate and graduate credits required for a Master of Architecture degree program. Since our graduate program requires 42 credits, a 126 credit undergraduate program will allow us to meet the minimum credit requirement established by NAAB.
- The minimum credit requirement must be in place by January 1, 2015 per NAAB's conditions.

#### Master of Architecture Curriculum Changes

A spreadsheet is attached which shows the M.Arch curriculum proposal developed and approved by the School of Architecture faculty. This curriculum was unanimously approved by the School of Architecture on November 28, 2012.

At the present time, the School of Architecture's graduate curriculum consists of a 3-semester 42 credit Master of Architecture degree. Our M.Arch program utilizes the Plan B Professional Paper or Project. In the course of developing our new undergraduate curriculum, the School determined that internal changes should be made to our 42-credit Master of Architecture program that would strengthen the curriculum and respond to the comments from our internal assessment process identifying the need for additional coursework in building systems, research and theory. The proposed curriculum does **not** change the total number of credits in our M.Arch program but substitutes new courses for existing electives and introduces a different sequence of studio courses to respond to the criteria outlined by our accrediting body.

Following is a list of the proposed changes to our existing M.Arch curriculum:

- Reduce the number of graduate electives required in our curriculum from 21 credits to 14 credits—providing a better ratio of required courses to elective courses in the program.
- Require two new courses, ARCH 535 Advanced Building Systems Integration (3 credits) and ARCH 526 Advanced Architectural Theory (3 credits), during the first semester of the M.Arch program.
- Increase the number of credits required for research from 3 credits to 4 credits and create a new course ARCH 575 Research Paper/Project that is a more consistently used rubric across campus than our previous course ARCH 552 Architectural Research Methods.
- Substitute a new graduate design studio course, ARCH 560 Masters Studio Project for one of our existing graduate studios
- Reorder the sequence of graduate design studios to be ARCH 558, ARCH 551 and ARCH 560.

#### **New graduate required courses**

- ARCH 526 Advanced Architectural Theory, 3 credits
- ARCH 535 Advanced Building Systems Integration, 3 credits
- ARCH 560 Masters Studio Project, 6 credits (will replace an existing 6 credit design studio)
- ARCH 575 Research Paper/Project, 1-4 credits (variable credit offering)
  - This course will replace our existing ARCH 552 Architectural Research Methods

#### **New graduate elective courses**

- ARCH 527 Architecture, Meaning and Place, 3 credits (previously offered under ARCH 525 Special Design Topics)
- ARCH 556 Advanced Studies in Interior Design, 3 credits (previously offered under ARCH 525 Special Design Topics)
- ARCH 566 Photography for Architects, 3 credits (previously offered under ARCH 525 Special Design Topics)

#### **Process and Rationale for Proposed Graduate Program Changes**

Over the last three years, the School of Architecture has undergone a rigorous curriculum review in order to develop an undergraduate and graduate curriculum that would meet the NAAB 168 credit minimum



requirement and address the required learning outcomes required by NAAB as part of their accreditation review. This review process included weekly meetings by the school's curriculum committee, individual interviews of faculty in each subject area by the curriculum committee, discussions at multiple faculty meetings each semester, and all-school forums in order to gain student feedback on the proposals throughout the process. A student representative has been on the curriculum committee throughout this process. Multiple scenarios were developed, debated, and refined. The outcome of this rigorous review process has resulted in the attached proposed curriculum for the Master of Architecture program. It was approved unanimously by the curriculum committee and by the School of Architecture faculty.

The School investigated a large number of scenarios including adding credits and courses to the undergraduate program, the graduate program as well as a combination of the two. The school looked at curricular areas that would benefit most from additional credits—in particular the areas of building systems, sustainability, research and design. We also looked at leveraging our graduate program to a larger degree since our current graduate program has a high proportion of open elective courses that could be converted to a series of more focused required courses. All of these scenarios were considered and contributed to the pedagogical approach we explored for our expanded curriculum.

Ultimately, it was determined that adding credits to our graduate program would increase the program of study from 11 semesters to 12 semesters resulting in increased tuition costs and time-to-graduation for all of our graduate students. However, adding credits to the undergraduate program could be accomplished within the current 8-semester B.A. in Environmental Design degree program and given the flat spot for undergraduate tuition, adding 6 credits to a student's undergraduate program of study could be accomplished without an increase in tuition costs for students. Given the emphasis on reducing time-to-graduation rates and the concerns about high levels of student loan debt, along with the pedagogical benefit of two new undergraduate courses on sustainability and research methods, it was decided that the additional 6 credits should be added to our B.A. in Environmental Design undergraduate degree program.

### **Graduate Program**

Because our accrediting body looks at both our B.A. in Environmental Design and our Master of Architecture (M.Arch) degrees together, we have approached the curricular changes to both programs in a holistic manner and include both undergraduate and graduate curriculums in the accompanying program of study sheet. The changes to our undergraduate degree were submitted to the Curriculum and Program Committee (CPC). The new undergraduate courses were approved by the CPC and the undergraduate curriculum changes have now been sent to Faculty Senate for their review.

Attached to this narrative is a spreadsheet layout of the proposed new curriculum approved by the School of Architecture. We have also included a copy of our existing curriculum (2012-2014)—in order to assist you with understanding the changes that are being proposed.

### **Background on Architectural Accreditation Requirements**

The National Architectural Accrediting Board (NAAB) is the sole agency responsible for accrediting architecture programs throughout the United States. Each architecture program must meet the 2009

Conditions for Accreditation, which went into effect in 2010, in order to maintain their status as an accredited architecture program. Section 2 Curricular Framework, which is contained under Part Two of the 2009 Conditions, contains the following requirement for NAAB accreditation as follows:

*"The number of credit hours for each degree is specified below. Every existing accredited program must conform to the following minimum credit hour requirements by January 1, 2015.*

- **Master of Architecture.** *Accredited degree programs awarding the M. Arch. Degree must require a minimum of 168 semester credit hours; or the quarter-hour equivalent, of which at least 30 semester credit hours; or the quarter-hour equivalent, must be at the graduate level, in academic coursework in professional studies and electives."*

Maintaining our NAAB accreditation is critical to the ongoing success of our program as almost all jurisdictions in the United States require an accredited professional degree, such as our Master of Architecture degree, in order to become a licensed architect. There are less than 160 NAAB accredited architecture programs in the United States.

If there are questions on any of these items please do not hesitate to contact Professor Ralph Johnson, chair of the School of Architecture Curriculum Committee, 994-4650, or Professor Steve Juroszek, Interim Director of the School of Architecture, 994-3921.



Montana State University - School of Architecture

**Proposed - Master of Architecture Curriculum - approved by faculty November 28, 2012**

updated February 25, 2013

**Bachelor of Arts in Environmental Design - 126 Credits  
Master of Architecture- 42 Graduate Credits**

**First Year- Pre-Environmental Design**

<i>Fall Semester</i>		<i>Spring Semester</i>			
Arch 121IA	Intro Design	3	ARCH 152	Design Fundamentals II	4
Arch 151RA	Design Fundamentals I*	4	PHYS 205	College Physics	4
MATH 150Q	PreCalculus	4		Univ. Core (W, US, D, CS, R/IH, R/ IN, or R/ IS)	9
	Univ. Core (W, US, D, CS, R/IH, R/ IN, or R/ IS)	3			
		14			17

**Second Year- Environmental Design Program**

<i>Fall Semester</i>		<i>Spring Semester</i>			
ARCH 241	Building Construction I	3	ARCH 254	Arch Design II	5
ARCH 253	Architectural Design I	5	ARCH 262	Architectural Graphics II	3
ARCH 261	Architectural Graphics I	3	ARCH 323IA	World Architecture II	3
ARCH 322IA	World Architecture I	3		Univ. Core (W, US, D, CS, R/IH, R/ IN, or R/ IS)	3
	Univ. Core (W, US, D, CS, R/IH, R/ IN, or R/ IS)	3			
		17			14

**Third Year- Environmental Design Program**

<i>Fall Semester</i>		<i>Spring Semester</i>			
ARCH 331	Environmental Controls I	4	ARCH 332	Environmental Controls I	4
ARCH 343	Architectural Structures I	4	ARCH 340	Building Construction II	4
ARCH 355	Architectural Design III	5	ARCH 344	Architectural Structures II	4
ARCH 363	Architectural Graphics III	3	ARCH 356	Architectural Design IV	5
		16			17

**Fourth Year- Environmental Design Program**

<i>Fall or Summer Semester</i>		<i>Spring Semester</i>			
Studio Options	ARCH 450 Community Design Center	5	ARCH 413	Professional Practice	3
	or		ARCH 452	Research Methods in Architecture	3
	ARCH 414 Arch Study Abroad and		ARCH 457	Adv. Architectural Studio	5
	ARCH 428 Foreign Study History			Non-architecture Electives	6
	or				
	ARCH 458 Arch Design VI and electives				
	or				
	ARCH 498 Internship				
	and				
ARCH 431	Sustainability in Architecture	3			
	Univ. Core (W, US, D, CS, R/IH, R/ IN, or R/ IS)	3			
	Non-architecture Electives	3			
		14			17

**Bachelor of Arts in Environmental Design - 126 Credits**

**Graduate Year- Master of Architecture program**

<i>Fall Semester</i>		<i>Spring Semester</i>			
ARCH 558	Comprehensive Design Studio	6	ARCH 551	Advanced Architectural Studio	6
ARCH 535	Advanced Building Systems Integration	3	ARCH 575	Research or Professional Paper/Project	4
ARCH 526	Advanced Architectural Theory	3		Graduate Electives*	5
	Graduate Elective*	3			
		15			15

*Fall Semester*

ARCH 560	Independent Project Studio	6			
	Graduate Electives*	6			
		12			

**Master of Architecture- 42 Graduate Credits**

**Non-Architecture Credits    300 or 400 level Credits    Total Credits**

*Subtotal First year*                      20                      0                      31

*Subtotal First year*                      6                      6                      31

*Subtotal First year*                      0                      33                      33

*Subtotal First year*                      12                      19                      31

**Total Undergrad**                      38                      58                      126

*Subtotal Grad year 1*                      7                                           30

*Subtotal Grad year 2*                      0                                           12

**Total Grad**                      7                                           42

**Total all credits**                      45                                           168

\* Students must complete 45 non-architecture credits prior to receiving their Master of Architecture degree. These credits can be completed at the undergraduate or graduate level. Students who have completed 45 non-architecture credits prior to or during the course of their graduate program may substitute 7 credits of architecture graduate electives for non-architecture graduate electives

**Legend for colors above**

ARCH 558	Comprehensive Design Studio	6	Black text for course number on blue background (course number only) indicates that an existing required course has been moved to a different semester
ARCH 560	Independent Project Studio	6	Black text for course number on tan background (course number and course name) indicates a new course

# Montana State University - School of Architecture

## Bachelor of Arts in Environmental Design and Master of Architecture Curriculum

Updated September 6, 2011

### Bachelor of Arts in Environmental Design - 120 Undergraduate Credits (EXISTING CURRICULUM)

### Master of Architecture- 42 Graduate Credits



#### First Year- Pre-Environmental Design

##### Fall Semester

Arch 121IA	Intro Design*	3
Arch 151RA	Design Fundamentals I*	4
M 151Q	Precalculus (or M171Q Calculus)	4
	Univ. Core (W, US, D, CS, R/II, R/ IN, or R/ IS)	3
		<hr/> 14

##### Spring Semester

ARCH 152	Design Fundamentals II*	4
PHYX 205	College Physics	4
	Univ. Core (W, US, D, CS, R/II, R/ IN, or R/ IS)	9
		<hr/> 17

Apply for admission into Second Year once ARCH 152 is completed

#### Second Year- Environmental Design Program

##### Fall Semester

ARCH 241	Bldg Construction I	3
ARCH 243	Architectural Structures I	4
ARCH 261	Architectural Graphics I	3
ARCH 322IA	World Architecture I	3
	Univ. Core (W, US, D, CS, R/II, R/ IN, or R/ IS)	3
		<hr/> 16

##### Spring Semester

ARCH 244	Architectural Structures II	4
ARCH 253	Architectural Design I	5
ARCH 262	Architectural Graphics II	3
ARCH 323IA	World Architecture II	3
		<hr/> 15

#### Third Year- Environmental Design Program

##### Fall Semester

ARCH 331	Environmental Controls I	4
ARCH 354	Arch Design II	5
ARCH 363	Architectural Graphics III	3
	Univ. Core (W, US, D, CS, R/II, R/ IN, or R/ IS)	3
		<hr/> 15

##### Spring Semester

ARCH 332	Environmental Controls II	4
ARCH 355	Architectural Design III	5
ARCH 340	Bldg Construction II	4
	Univ. Core (W, US, D, CS, R/II, R/ IN, or R/ IS)	3
		<hr/> 16

#### Fourth Year- Environmental Design Program

##### Fall Semester

ARCH 313	Professional Practice	3
ARCH 456	Architectural Design IV	5
	Non-Arch Electives	7
		<hr/> 15

##### Spring or Summer Semester

Studio Options	<u>Take one of the following:</u>	
	ARCH 450 Community Design Center	5
	Electives	7
	or	
	ARCH 414 Foreign Study and	9
	ARCH 428 Foreign Study History	3
	or	
	ARCH 458 Arch Design VI + electives	12
	or	
	ARCH 498 Internship	12
		<hr/> 12

ARCH 414/428 takes place in:  
Summer Semester: Rome Studio/Europe  
Spring Semester: Asia or South America

Apply to Graduate Program once Arch 456 is completed

#### Graduate Year- Master of Architecture program

##### Fall Semester

ARCH 551/557	Adv. Arch Studio	6
	Arch. Graduate Electives***	9
		<hr/> 15

##### Spring Semester

ARCH 558	Adv. Building Studio	6
	Arch. Graduate Electives***	9
		<hr/> 15

#### Graduate Year- Master of Architecture

##### Summer Semester

ARCH 551/557	Adv. Arch Studio **	6
	Arch. Grad. Elec.***	6
		<hr/> 12

\* ARCH 121, ARCH 151RA and ARCH 152 are offered in Summer Semester for second degree students and transfer students

\*\* All students in the School of Architecture curriculum must enroll and complete at least one summer graduate design studio

\*\*\* Students must complete 45 non-architecture credits prior to receiving their Master of Architecture degree. Students who have completed this requirement in their undergraduate studies may substitute Architecture graduate electives for the Non-Architecture graduate electives