Natural Sciences and Mathematics Council

Meeting Minutes for January 26th, 2016

Student Union 2579 3:30 – 4:30 PM

Call to Order

- **Roll Call** – Peter Andreana
- **Presiding** – Bruce Bamber
- **Present:** H. Chen substituting for Jim Anderson, Edith Kippenhan, David Krantz, Kathy Shan, Don Stierman, Sibylle Weck-Schwarz, Hans Gottgens, Tim Mueser, Katharine Fisher, Kevin Gibbs, Yanfa Yan, Bill Taylor, Peter Andreana, Anthony Quinn, Mike Cushing, Dennis White, Gerard Thompson
- **Others Present:** John Plenefisch (ex-officio), Joseph Schmidt, Jon Bjorkman, Mike Heben
- **Absent:**

Last Meeting:

Corrections to the minutes:

No corrections to the previous meeting minutes noted.

Called vote to approve the previous meeting's minutes.

Council voted unanimously to accept the minutes with no changes.

STEM Presentation

STEM Presentation by Tony

Tony: I want to share about a couple programs going on in the college of Natural Science and Mathematics. Two programs going on, one started last summer - the Multicultural Emerging Scholars program (summer bridge program). It evolved into a living learning community. Targeting a specific cohort of students and the application deadline for this year is April 1, 2016. The program went well last year and they got approval from the Provost to continue the program for a second year with potential to expand after that. The participants receive an $8000 scholarship (not cash) that covers tuition for 8 credit hours of summer classes. They participate in math camp; housing and meals included for the summer. So, tuition, room and board for summer session II and enrollment in the Living Learning Community. The program is designed to help 1st year students make the academic and social transition from high school to college and achieve academic achievement in the courses. One lesson they got from the program: passion is a must. Insight into the program indicated that the social aspect was just as

important as the academic aspect. The bridge program takes away choice and tells the students what they must do based on their academic background. The cohort of students selected had to be admitted to the college of Language, Literature and Social Sciences or to the college of Natural Science and Mathematics. It spilled into a couple more colleges. Provost agreed to double the size of the program. Started out with 30 students and are talking about doubling it to 60 students. If they double, the Provost would like to include a couple more colleges. The cohort of students are at-risk students. GPA between 2.0 and 3.2. ACT score between 16 and 20. Preference to African Americans, Latinos and Hispanics. Requirement is for parents to attend the orientation.

The courses the students took were English Comp I, Intro to Anthropology and a disciplinary course called Learning to Serve, and participated in math camp. In the fall they all took a course together called Learning to Lead. They were encouraged to pursue a Bachelor of Arts degree instead of a Bachelor of Science degree. Recommend they minor in a social science. They have study tables and try to meet frequently with faculty. Program saw 25 students enrolled. 22 African American, 2 white and 1 hispanic student. Targeting minorities. Incoming GPA was about 2.6 for the cohort.

After the summer, the GPA rose to about 3.15. *Pictures shown*. The cohort got to interact with a group of international students, which was successful and a decision was made to make that part of the program.

Students in general did very well. The NSM students did better than the LLS students. For the majority, their GPA was higher here than in high school. The hope is to expand the program and include students from Education once they determine the composition of LLS.

The second program is called *We Are STEM*. Spearheaded and developed in our college in collaboration with the division of student affairs. It was last spring with a seminar hosted on the Health Science campus. It was brought forth that the students at the Health Science campus don't do anything for Black History Month so a committee was formed to set up a seminar. It was decided to continue with it. The five colleges of science got involved. Met several times over the summer and it was a collaborative effort and supported by the deans of all five colleges. Idea was to celebrate and strengthen diversity among the students at University of Toledo. Collaborating with a variety of student organizations that include diversity in their charter or agenda. First event held at the engineering campus (a meet and greet). Two events are planned for this semester – February 17th: Speaker will be Dr. Rivers from Henry Ford; second event in April: Tentative commitment from Damon Tweedy (wrote *Black Man in a White Coat*).

Hoping to obtain extramural funding for these programs down the line.

Bruce: This work should be on our college web-page.

Tony: Yes it should. Stokes Midwest Center for Excellence is something we joined 2 years ago. It is a regional consortium of universities focused on diversity. Next week I am going to IUPUI with some math colleagues. IUPUI has a math tutoring program they are going to talk about and showcase.

Saturday Morning Science

Joseph Schmidt: Doing Saturday Morning Science for the spring semester over the past 10 or 11 years. People coming to give some talks. *Handed out flyers for distribution among the buildings.*

Physics Program Modification

Mike (from Physics department) - Change to the graduate program, the Professional Science Masters degree in Photovoltaics.

Mike: A proposal was prepared and submitted to NSF to establish the program. It wasn't supported but we decided to go ahead with it anyway. Populated the program with a cohort of 5-6 students each year. The degree is offered in the physics department. Challenge is that it is focused in the physics department, some of the materials science is done in the engineering and chemistry department as well, and we want to open the program up to more people. There is a 24 week capstone internship project at the end 1.5 years of coursework, where the students do research with faculty members, to an internship project. Have had students go to the Department of Energy in Washington D.C. and also to the National Energy in Colorado and local companies as well. Configured as a hard core physics degree is problematic or a stretch for people to come in from chemical/electrical engineering departments or materials science and chemistry departments. Want to transition the program into one that is revenue generating rather than one supported by the university and we needed to open up the pipeline. We did that. Some of the students stumbled with taking Quantum Mechanics II at the graduate level. We want to protect the quality of our physics degree. Once we put the PSM label on it, it changed a little bit for the good. The students can opt to take other courses rather than the upper level physics courses. Most of their curriculum is in the physics department. There were 3 business courses they could take (i.e. supply chain management course). Feedback said that the information systems course wasn't very valuable to the graduates. Things missing – statistics (to design experiments). The physics core was not changed much except to allow there to be a couple different physics courses, so credit hours remain the same there is just more flexibility.

Hans: Our department just submitted a proposal for PSM in environmental sciences. Curious to learn what went wrong, what went right for Mike.

Mike: Challenges transitioning to a revenue generating program. Also, if it is going to be interdisciplinary, there are issues with where the degree is centered and if your colleagues are going to be supportive of that. How do make a degree more interdisciplinary and centered within a given department without undermining some of the cores of the department.

It is a little more time into the last summer. First year is 2 semesters and a summer. The second year is another semester of courses (research) and then the 24 week internship starts in January and runs until June 30th. It's a little bit of wrinkle to have the internship be longer than 1 semster.

Bruce: So this was voted unanimously by the curriculum committee?

Mike: Yes.

Furthermore there are 2 or 3 undergraduates from the program recently in the past few years. Students were generally not very well prepared to compete in this area (PSM program).

David: Originally as I recall, when it went through Arts and Sciences, one of the selling points is that this would be a business twist to this program, with the business courses being offered. Now it looks like students get away without having to take any business courses.

Mike: I don't think so. There are 3 elective blocks. There are still entrepreneurial courses involved, supply chain management and business statistics.

Vote to pass the program modification.

Unanimously voted to approve.

Change to all the programs in physics and astronomy

Mike: Subcommittee got together and evaluated the curriculum and made a bunch of important changes that everyone agreed upon in the department. We wanted to add a couple of courses (computer programming and statistical methods). We picked a minimum set of core physics courses. The students were not prepared when it came time for the GRE. Students were taking advanced physics courses in their senior year. They hadn't taken advanced mechanics or advanced E&M and they were doing poorly on the GRE, for those who wanted to go on to graduate school. Rejiggered the scheduled and they have those down in their junior year now. Had to remove some physics courses to account for the change. Added experimental learning to get them experiencing things – applied coursework. Invented a new course at the sophomore level that will have a lab component as well. Also adding a capstone research project at the end in their senior year. Also adding a professional development course. Had success with the graduate level professional development course and decided to shift it

down to the undergraduates to prepare them. This in total requires 9 title changes (names changes, prerequisites) to bring everything into compliance and then 3 new courses.

Also making changes to the BA in astronomy and physics and the minors in physics to have everything lined up.

Jon: Set up so it can be (something) down to 120. Set up for 124 but it can be brought down to 120.

The state gives a range of 120-126 hours so they are not telling you that you need it. For any science, I would say don't, just set it up to where you think it's necessary.

Question: So the core program in the major increased from 22 to 34?

John: No, it's just the way it's listed there, it's set up is about the same. Part of it is that we have some concentrations (biomedical) changed quite a few required courses, so that range of 6-20 hours is the range over different concentrations. If you add it all up it's about the same, in major and related courses. We dropped courses to facilitate moving the core concentration up to the junior year. Dropped 2 courses to add in the experimental things.

Mike: The first new course is Foundations of Astronomy. 4 credit hour course – 2 in class, 2 in lab. The rational is that students aren't prepared to take their 4000 level astronomy courses. Take out some of the classic astronomy, etc. and move it down to a sophomore level course. Do lab in the new renovated space in the Berck Observatory.

Next course is the physics capstone project. 1 hour, 4920. Require them to do some sort of research that will culminate in an oral presentation at the spring undergraduate research symposium and a written paper on their project. A way to formally require them to interact with faculty and do some research.

Jon: Another purpose is for the traditional research with their professor and to allow an opportunity for them to do internships. Could turn the internship into their capstone project. We want to be flexible.

Question: Is it individual faculty or one faculty member for the capstone course?

Jon: The way the project works is we have a requirement for research under individual faculty and then for then physics capstone course would be under the supervision of some other faculty member who is responsible for grading the presentations and papers. In principle what we want to do is have a professional development course – where students select the project for the capstone.

Mike: Final course required is Physics 4950 – undergraduate professional development seminar. Trying to prepare the students for graduate school or jobs. 1 credit, done in Fall of senior year.

David: Seems like all your courses are 4000 level courses and very few lower. Now you are proposing a high level 3000 course in the sophomore year. What is the justification for the numbering or does it not matter?

Jon: We had discussions about that in the curriculum meetings and one of the issues is that the curriculum was originally designed 40 years ago. So the population of students is probably different than what we have today. The traditional junior level courses were put in the senior year and given the 4000 level numbers. That is causing problems for the students to be prepared for the GRE. We felt it was important to push those courses into the junior year. Since these courses have been on the books with the same numbers for a long time we felt it would inappropriate to change the numbers.

Tim: Would you consider changing 3880 to 2880 since it's a sophomore level course?

Jon: Trajectory course number is 2000 for undergraduate majors. It's not a trajectory course so that's why.

Edith: So I heard there is an amnesty day coming up for doing a bunch of course changes without having to go through all the procedures, so would renumbering be something that falls into that?

Jon: No. The idea is just minor stuff

Called for vote on the change to the BS in physics for all four concentrations, including the 3 new courses.

Voted unanimously to pass.

Mike: 3 other changes to keep in line with the program modification for a BA in physics. Changes are similar to the changes for the BS in physics. New capstone course and professional development required and to make the upper level courses less restrictive to attract more students.

Jon: One of the changes is that the individual research requirement is not required for the BA (or only 2 hours instead of 4 hours). For the junior/senior level courses, we don't specify specifically which courses should be taken, only require a certain number of hours, which allows more flexibility to choose which they want.

There tends to be some tendency for the BA students to transition into education programs. The BA in astronomy tends to be a fall back for the students in the BS program who were struggling. We find there are a fair number of students that want a BA in astronomy for whatever reason even though it's not taking them towards graduate school, they just have a passion and an interest.

Hans: This is not just with physics but for other BA programs in our college, I wonder where the arts in the bachelor of arts is. It looks like a less rigorous science. Isn't there an option maybe in the future where we will insert courses in economics or policy or planning or whatever a BA person would use.

Bruce: Yeah, I think that is a college requirement on the BA.

Question: I think we are missing the boat on this and missing an opportunity. For example what are the math requirements for a BA and BS in physics?

Jon: Only 1 or 2 courses. BA are taking calculus. The math requirement is not that different for a BA versus a BS in physics.

Question: Jon, it looks like 3610 got orphaned, it's not for any elective or anything.

Jon: It's for the applied physics concentration.

Question: The concern is how many students are going to be in a given class. Are we talking 2 or 3 or 20 or 30?

Jon: No, it won't be a problem for that particular class. The applied physics concentration is one of the largest we have so we have a fair number of students.

Bruce: The roadmaps for the curriculum are available, right?

Yes, on the website.

If you do it just right, you can do it in four years.

Asked for a vote for a change in the BA in physics program.

Voted unanimously to pass.

Undergraduate degree change for a BA in Astronomy

Mike: Again, this is a change to bring the BA in astronomy in line with all the other changes. The capstone project and the professional development course are required along with the Foundations of Astronomy course will be required.

Question: Assuming these changes are coming out of curriculum with a unanimous vote?

Mike: Yes. Only a few weren't given unanimous support.

Voted for the change in the BA degree for Astronomy.

Voted unanimously to pass.

Minor in Physics and Astrophysics

Mike: Again, changes made to get the program in line with all the other changes. Not increasing credit hours.

Jon: Labs are not required for the minors.

Voted for the change.

Voted unanimously to pass.

Chemistry and Biochemistry Course Modification

Mike: Chem 610 (Environmental chemistry) to a graduate class. The change is in the prerequisite. Motivation for the change is that there are students who come in from Chem 2420 need permission from the Chem 2420 instructor to get in. Want to make the change from Chem 2420 to admission into a program because there are a lot of students who go directly into this program and this way with an if/or statement it will just accept you into that class and the professor doesn't need to sign off on it.

Question: Might want to check and see if Banner can do the if/or statement. Might just want it to be "graduate standing".

Edith: Hate to bring it up, but that's a limited graduate standing, is it supposed to be specific to just chemistry and chemical engineering or the MSE program?

Mike: Not sure.

Vote for approval.

Voted unanimously to pass.

Chemistry/Biochemistry New Course

Mike: Chem 6970/8970 - a graduate professional internship, credit hours 1-6. Idea is to create a course for the required internship for the professional sciences Masters degree in green chemistry. It's a Chem Engineering course and they are just creating an equivalent numbered course for chemistry.

Can vote, with a recommendation to put the syllabus in the correct format.

A vote to pass the change.

Voted unanimously to pass.

Program Modification: Professional Science Masters Degree in Green Chemistry and Engineering

Mike: A simple change of name from Special Topics Chem 6980 to Thesis Research 6960. Correction to original PSM proposal. Just want to change the name to make it more appropriate.

Tim: Do students actually do a thesis? I thought in the PSM's is not necessarily thesis based. So how can the name say thesis?

There is directed research.

No thesis, you can't use Thesis Research.

Mike: I'll send that one back.

Chemistry and Biochemistry Undergraduate New Course

Mike: Chem 4200 – Green Chemistry, cross listed with Chem 6200 and 8200. This is just to cross list an existing course so the students moving on to graduate school can take the courses as an undergraduate. The differences in the courses – the learning outcomes which are in 6200 and 8200 but not in the 4200 (not required of the undergraduates)

David: Would a student coming to take this course at the 8200 level, what is the difference in their background? How can you teach a course as undergraduate course and an advanced PhD level course?

Mike: Graduate council won't see this because 6200 and 8200 are already on the books. 4200 is being added in.

I would feel better if this was presented as the 4200 having fewer credit hours than the 8200.

Mike: The differences are non-existent, they just have to do a project for the 8200 level.

Recommendation: Make it 4200 and 6200 and get rid of 8200.

There is efficiency with having one course with everyone in there. So, you don't need an 8200 level. But 8200 already exists.

Mike: We could accept this and require them to get rid of the 8200 course.

Suggestion from group: Approve the modification but have them revise it to make the 8200 an inactive course. We support the cross list of 4200 and 6200 but we don't think it's appropriate to have the 8200 as the same course.

Vote for the suggestion.

Voted unanimously for the suggestion.

Undergraduate Course Modification Physics 2010 and 2020

Mike: This is not part of the stuff from earlier. Technical physics I and II. At the request of the engineering department, adding a 1 hour recitation, which takes the course to 5 hours. Currently it is standard in the rest of Ohio for this course to be 5 credits and they want their students to be able to transfer this course to other universities.

Not currently a tagged course. They probably want the change in order to tag it.

Vote to allow the change.

Turned down.

In Closing

Bruce: Curriculum meeting coming up, want a sense, what does everyone think of email votes, if needed. This is for the amnesty vote.

Everyone is/was okay with an email vote.

Anyone with a report from Graduate Council, please send the report to Bruce and he will email it out.

Meeting adjourned at 5:12 pm.