**CMB Majors – info for students & advisors – March 2018**

The following information addresses some common questions regarding scheduling of courses.

***In general***, you will have no problem accounting for prerequisites & completing your degree in a timely manner if you:

1) take CMB 155 (Introduction to Cell & Molecular Biology) & 156 (Discovery in Cell & Molecular Biology), **offered this**

**year as CMB 180 sections *for students starting the major in the Fall 2018 semester*,** & CHM 115 & 116 (Principles of Chemistry I & II) in your *freshman*year.

 2) take CMB 250 (Introduction to Biotechnology) your *sophomore* year.

 3) take BIO 375 & 376 (Genetics lecture & lab) & CHM 241 & 242 (Organic Chemistry series) in your *sophomore* year.

 4) take CMB 405 & 406 (Cell & Molecular Biology lecture & lab) *in your junior or first semester senior* year.

5) **begin independent research** ***prior to your* *final Fall semester****. W*e encourage you to begin research ***much earlier*** in

 your undergraduate career. It can be beneficial to at least begin your research during the spring/summer periods.

 You will ultimately be presenting your research in the Capstone course (CMB 495) which is offered ***both*** semesters

 for the 18-19 academic year & is taken during your final semester. You will hear about research options in the CMB

 250 course, but please also talk with your advisor. Information regarding research & internship opportunities is

 also posted on the CMB website. See the next page for more information.

 6) meet with your advisor regularly. ***Do not panic(!) if you did not take the courses in the above order***.

Remember **the CMB Combined BS/MS Degree Program** is also an option. You apply for entrance to this program as a junior after taking the coursework required for consideration (<https://www.gvsu.edu/cmb/combined-degree-program-accelerated-bs-ms-in-cell-82.htm>). Upon finishing the program (planned to take 5 years), you will have both a BS and an MS degree from the CMB Department – ***this is both a time & tuition dollar-saving program***. Please take a look at the CMB website for more information & talk to your advisor if you are interested.

**GVSU policy**

 1) Courses can be repeated once without additional permissions.

 2) Prerequisites are enforced through Banner.

**Information regarding required courses**

**• Math requirement**

 Either MTH 125 OR 201 is acceptable for the CMB major.

**• Physics requirement**

 • PHY 230/231 is a calculus-based physics series; take this series if you have a strong interest. Otherwise, take the PHY 220/221 series.

 • Note that PHY 221 requires some knowledge of trigonometry (covered in MTH 123). If you took the math placement exam & were placed in MTH 201, you should be fine. If you have not had trigonometry before, you will want to take MTH 123 prior to taking PHY 221.

• If you are planning on medical school in the future, you should take physics at GVSU rather than at a community

 college.

**• Microbiology requirement**

Either BIO 357 OR BMS 212/213 will fulfill this requirement. BIO 357 is a general microbiology course while BMS 212/213 is more of a medical microbiology course. ***You can also take CMB 351 Bioinformatics in place of the microbiology requirement.***

**• CMB 250 – Introduction to Biotechnology**

One section is offered each semester. ***This class fills so do not delay in registering for this class*.** *If you can’t register for this because it is full, please contact with the listed instructor.*

**• CHM 241, 242 – Organic Chemistry**

 You can substitute CHM 245 through 248 for the CHM 241/242 Organic Chemistry series. This option is listed on the Advising Worksheet for CMB Majors.

**• CMB 405 – Cell & Molecular Biology lecture**

CMB 405 is offered Fall, Winter, & Spring sessions. You must complete the organic chemistry requirement (& BIO 375 Genetics) before taking CMB 405. The pace in this course is very fast if you take the Spring section, so do not plan on taking any other courses at the same time. There are now 3 lecture sections offered in both the Fall & Winter semesters.

**• CMB 406 – Cell & Molecular Biology Laboratory**

This course can be taken concurrently with CMB 405. Note that CMB 406 is the prerequisite for CMB 426; these two courses cannot be taken concurrently. ***Also, note that 1 section in the Fall & 2 sections in the Winter are offered at CHS downtown, so you do not want to schedule this course back-to-back with anything on the Allendale campus because you will need to allow for travel time. CMB 406 is also offered during the summer (12 week session on Wednesday afternoons)*.** Note that this is an SWS course – as such, you must get a grade of C or better to get SWS credit.

**• CMB 426 – Nucleic Acids Laboratory**

This course is offered in the Fall semester (Tues/Thurs afternoons). However, ***if you need to take it in the Winter semester, you will register for CMB 626*** which is held at the Center for Health Sciences (downtown) on Mon/Wed mornings (so don’t schedule an Allendale class immediately afterward as you will need travel time). Since in the Winter semester you are registering for a course with a graduate number, you will fill out an additional paperwork to register – the dual credit form. (The graduate & undergraduate sections of this course are the same except that graduate students do additional presentations; as an undergraduate in CMB 626, you will not do the additional work, but will attend the presentations.) CMB 406 is the prerequisite for the Nucleic Acids lab. If you are planning on submitting applications in the Fall for graduate school, you may well be interviewing for graduate programs during the Winter semester. Therefore, we recommend you take CMB 426 in the Fall. ***This course often fills, so do not delay in registering for this class.*** *If you cannot register because the course is full, please keep in close contact with the listed instructor.*

**• CHM 461 – Biochemistry I**

 This course is offered Fall, Winter, & Spring semesters. The pace is very fast if you take the Spring section, so do not plan on taking any other courses at the same time. Pay close attention to the section locations as some sections are downtown & some are on the Allendale campus.

**• CHM 462 – Techniques in Biochemistry**

Two sections are offered in both the Fall semester & Winter semesters (Tues/Thurs morning &Tues/Thurs afternoon sections). ***All four sections are held in Room 543 CHS downtown, so don’t schedule this back-to-back with an Allendale course as you need to allow for travel time.*** If you are planning on submitting applications in the Fall for graduate school, you may well be interviewing for graduate programs during the Winter semester. Therefore, if you want to take CHM 462 in the Winter, you will want to register for the morning section as it will interfere less with the typical grad school interview schedule. Note that this is also an SWS course so you need to get a minimum grade of a C for the SWS credit. ***RE taking CMB 426 & CHM 462 the same semester – it is do-able, but you will be very busy. If you can, take them separate semesters.***

**• CMB 495 – Perspectives in Cell & Molecular Biology (Capstone)**

This year the Capstone will be offered ***both*** semesters (6:00-8:50 pm on Wed in the Fall; 1:30-2:45 Mon/Wed in the Winter). Remember, you must have previously been registered for CMB/BIO/BMS/CHM 499 (Independent Research) or 490 (internship) before registering for CMB 495.

1) ***Do not delay in registering for this course.***

2) ***You must have initiated your research well before the semester you take the Capstone course as you will be***

 ***doing an oral presentation of your research in this course during the Undergraduate Research Symposium.***

3) *If you cannot register because the course is full, please contact the instructor as soon as possible.*

**• CMB 499 – Independent Research**

You are required to do at least 3 credits of research as a CMB major; you can do more than 3 (& most of our majors do). To register for these credits, you will fill out the Registration Permit form to submit to the CMB office (3300A Kindschi Hall; also available online from the CMB Department’s ‘Forms’ link under Faculty/Staff) which will then go to Dr. Staves. With his approval, you will be able to register for CMB 499 through Banner. If you will be doing research with a GVSU faculty member, he/she may ask you to fill out a second short form at the same time for funding for supplies for your research.

 As mentioned above, there will be several opportunities to learn about research options, & there are many options as to where you do the research. That said, it never hurts to start asking about it early. You can do research here with

a GVSU faculty member (from a variety of departments), with a mentor at the Van Andel Research Institute or with

MSU faculty downtown, elsewhere in the country (or world) through an established program (see the CMB website for suggestions), or via an internship situation you identify & which is approved by GVSU. To get started thinking about research, please talk with your advisor (or with other faculty & students at the monthly pizza lunches).

**Information regarding possible electives which are newer/for which there are changes for the upcoming year**

**• CMB 180 Living Foods: Ferment Them Yourself**

An introduction to fermentation as a part of food preparation. The history and human culture, food preservation and safety aspects, and the science of fermentation processes related to food and health will be covered. The laboratory will include the hands-on applications of fermentation in the preparation of bread, yogurt, kefir, and sauerkraut and other vegetables, etc. as is done in home kitchens. Course offered winter semester. 4 credit hours.

**• CMB 321 – Designing Our Future: Babies, Food, Medicine, and Biotechnology**

***Issues course*** which introduces the concepts and theories of biotechnology, and includes an in-depth exploration of a biotechnology issue, such as designer babies, GMO food, and personalized medicine, within a group setting. Student groups will create a White Paper and lead a discussion on the biotechnology issue of their choice. Part of the Information, Innovation, and Technology Issue. Course offered fall semester. Prerequisite: Junior standing.
3.000 Credit hours. ***Note that this counts as both a CMB elective AND an issues course.***

**• CMB 350 – Foundations of Brewing**

Introduction to history, culture, theory and practice of brewing. Students design and brew a beer of choice. Implications of beer consumption on social, psychological and biological health are emphasized. Effects of human migration, technological advances, economics, culture and globalization on beer production are also addressed. Part of the Health Issue. Course offered fall and winter semester. Prerequisite: Junior standing. 3.000 Credit hours. ***Note that this counts as both a CMB elective AND an issues course.***

**• CMB 452 Computer Modeling of Biomolecules**

Formerly known as Computational Biology. This course covers three groups of topics in computational structural biology: protein structure prediction, molecular simulations and structure-based drug design. Offered winter semester. Prerequisites: CMB 250 or CHM 461, PHY 220/PHY 221 or PHY 230/PHY 231, or **permission of the instructor. If you have problems with the prereqs, please contact Dr. Szarecka** **szarecka@gvsu.edu****.** 3.000 Credit hours

**• CMB 480 02 Molecular Diagnostics**

Offered Fall only, 6-8:50 pm Wed on Pew campus (EC). This course provides principles and applications of genomics and molecular tools for disease diagnostics.  Topics include molecular and computational tools of genomics, genome structure, diagnosis of disease, gene expression, and biological networks. Prerequisites: BIO120, and (BIO 355 or BIO 375 or permission of instructor). 3 credits

**• CMB 620 Cell Culture & Bioprocessing**

Theory and practice of eukaryotic and prokaryotic cell culture methodology, including the use of fermenters and bioreactors. The application of culture methods and bioprocessing for use in biotechnology will be stressed. Offered winter semester. Prerequisite: CMB 520 or equivalent ***or permission of the instructor***. 3.000 Credit hours

***While we believe the information in this document is correct, please be sure to confirm details in Banner.***