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## **PROGRAM-TO-PROGRAM ARTICULATION AGREEMENT**

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**University of Wisconsin – Whitewater**

**Physics/Engineering Dual Degree Program**

College of Letters and Sciences

**University of Wisconsin – Madison**

**College of Letters and Sciences**

UW – Madison College of Engineering

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### **UW – Whitewater Physics/Engineering dual Degree Program Information:**

*I'm interested in being an engineer. What are my options at UW-Whitewater?*

In the state of Wisconsin, schools that offer engineering degrees include UW-Madison, UW-Milwaukee, UW-Platteville, Marquette University, and the Milwaukee School of Engineering (MSOE). UW-Whitewater does not offer an engineering degree, but can offer you a start towards a career in engineering. Your three options are:

- 1.) Transferring to one of the above schools after one or two years at UW-Whitewater
- 2.) Completing a physics degree from UW-Whitewater and then applying for a job at an engineering company **or** applying to a program which offers a Master's degree or PhD in an engineering field
- 3.) Participating in our dual degree program, where you earn a bachelor's degree in physics from UW-Whitewater and second bachelor's degree in engineering at UW-Madison or UW-Milwaukee

**1. The transfer option:** Before starting into their engineering courses, most engineering majors are required to take classes in math, physics, chemistry, and computer science. At some universities, these are large lecture courses, where it is easy to disappear into the crowd. At UW-Whitewater, these classes are typically twenty to forty students, where you get to know your professor well. Because tuition is also less expensive, many students interested in engineering choose to start at smaller schools and transfer after their first or second year. Different schools have different transfer requirements. The requirement to transfer to UW-Madison College of Engineering includes the following:

- Two years of a foreign language in high school, or two semesters at UW-Whitewater
- At least 24 credits overall
- Communication 110
- Physics 180, Physics 190, Chem 102, Chem 104, Math 253, Math 254
- At least 17 credits in calculus, statistics, chemistry, physics, computer science, with a 2.5 GPA in these courses.
- At least a 2.0 GPA average in all other courses

**These are the minimum requirements to apply. A minimum cumulative GPA of 3.0 is usually needed to be accepted.** Note that UW-Madison counts all courses taken. If you retake a course at UW-Whitewater, both grades will be factored into your GPA. The UW-Madison deadlines for transfer applications are February 1<sup>st</sup> (Summer & Fall semesters), and October 1<sup>st</sup> (Spring semester). Since these requirements change over time, and vary from school to school, it is **your** responsibility to find out what they are. We will try to keep you informed of the changes.

**2. The UW-Whitewater Option:** A recent national survey of students with physics bachelor's degrees found that 40% of students who find employment right after graduation work in engineering. Many engineering firms recognize that physics majors are good problem solvers and have "learned how to learn." A listing of companies that have recently hired physics bachelors is maintained at <http://www.aip.org/statistics/trends/states/state.html>. The UW-Whitewater physics class, Physics 489 (Senior Seminar), focuses in part on finding jobs with a physics degree.

The lore regarding employment in engineering is that obtaining a master's degree in engineering (available at most schools listed above) significantly enhances your earning potential as an engineer. Many students who finish a four-year program here will apply to a school for two additional years of classes and projects in a specific field of engineering. One of the advantages of this path is that you end

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up with an advanced degree in a specific area, which may open up job opportunities with particular companies. However, acceptance to a graduate program is by no means assured. Again, a minimum overall and science GPA of 3.0 is usually a requirement of graduate programs.

**3. The Dual Degree Option:** UW-Whitewater has agreements with both UW-Madison and UW-Milwaukee called a “dual degree” program, where students start at UW-Whitewater, transfer to one of these schools, and earn **two** bachelor’s degrees: a bachelor’s degree in physics from UW-Whitewater, and a bachelor’s degree in engineering from UW-Madison or UW-Milwaukee. This is sometimes called a “3-2” program, because it *often* involves three years at UW-Whitewater, and two years at the other school. However, the number of years depends on both progress towards the degree at UW-Whitewater and the degree requirements for the specific engineering program at UW-Madison or UW-Milwaukee. For example, a dual degree in physics/electrical engineering is usually possible in 3+2 years because of a large overlap in required and available courses; a dual degree in physics/chemical engineering may be 3+3 years because of many additional courses required in chemistry. The *advantage* of this program is that you have the level of general knowledge implied by a physics degree, and an area of specialization implied by an engineering degree. This may open the door to additional employment opportunities. The *disadvantage* is the extra cost in time and tuition.

As far as UW-Madison or UW-Milwaukee is concerned, you are a transfer student. You come to them with a set of courses, many of which will count towards courses at their institution. Most of the introductory courses offered at UW-Whitewater have well-established equivalences with courses at Madison or Milwaukee, which can be checked at the UW-System Credit Transfer Wizard: <http://tis/uwsa/edu/widards/>. Transfers for the upper level courses in our physics program are less established, and may need to be determined at Madison or Milwaukee by the transfer coordinator. **Make sure to keep an electronic copy of the syllabus for every course you take if you are considering transferring or doing a dual degree.**

As far as UW-Whitewater is concerned, you should finish all degree requirements **except** for half the upper level physics courses. Any engineering courses you take at UW-Madison or Milwaukee will be transferred back to UW-Whitewater for the remaining physics credits (the requirement that you take your final credits at UW-Whitewater is waived). When you are awarded your engineering degree, you are simultaneously awarded a bachelor’s degree in physics. **Note that this second part does not happen automatically: you must contact the department chair of the UW-Whitewater physics department and let them know of your imminent graduation at UW-Madison or Milwaukee.** After verification, your engineering classes will be transferred back to UW-Whitewater and you will be awarded a second degree. You can participate in both graduation ceremonies if you wish.

In order to do the dual degree program, you must satisfy the following requirements:

- All of the admission requirements for transfer students at UW-Madison or Milwaukee, including the foreign language requirement.
- Greater than 3.0 GPA both overall, and in math/physics/chemistry classes.
- Completion of all UW-Whitewater general education requirements, including GenEd courses, a diversity course, physical education, etc...
- Completion of a minor (usually math) and all “unique requirements” (Math, CompSci, English 370 or 372)
- Completion of at least half of the upper level (>200) physics credits required for a physics major. There are 38 credits of physics required for engineering majors, or which 12 are lower level (Physics 180/181= 10 credits + Physics 190 (twice)= 2 credits.) The current requirement is  $(38-12)/2=13$  credits.
- Arrange for a letter of recommendation to be sent to the College of Engineering by the UW-Whitewater Physics department chair.

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One difference between dual degree and a straight transfer is that if your GPA(s) are greater than 3.0 you are **guaranteed** admission to the UW-Madison College of Engineering (but not UW-Milwaukee). However, you are not necessarily guaranteed admission to the program of your choice. For example, Biomedical Engineering at UW-Madison usually only takes students with a GPA of >3.5.

**Since UW-Madison and Milwaukee treat you as transfer students, you must submit a transfer application (as described on the previous page) at the appropriate deadline. When you do so, you must inform the department chair so they can provide a letter in support of your application.**

**Making your choice:** Students interested in one of the options outlined above should be declared physics majors in the Engineering Emphasis, but do not need to commit to any of these three tracks. In other words, you are free to transfer anytime, or to become a dual degree student (if you've satisfied the above requirements), or to stay and finish your four year degree in physics.

*It will help greatly in making your decision to have an idea of what type of engineering you are interested in going into (this is part of the Physics 190 course). Some engineering programs, like electrical engineering, have a high degree of overlap with physics, math, chemistry and computer science courses available at UW-Whitewater. Others, notably chemical engineering, have less overlap and may longer to complete. We continue to work on a table of upper level course equivalences so you will know what transfers as what.*

If you know which engineering program interests you, you should study the requirements for that program and try to lay out an end-to-end path that will help you determine how long it takes to get to graduation.

### **Procedure for students to obtain UW-Whitewater Dual Degree in Physics:**

#### **WHILE STUDENTS ARE STILL AT UW-WHITEWATER**

- Two weeks before application deadline to UW-Madison or UW-Milwaukee (Oct 1<sup>st</sup> or Feb 1<sup>st</sup>), students should make an appointment with their academic advisor to verify that they will be eligible to transfer upon successful completion of that semester.
- Students should then request a letter of recommendation be sent to UW-Madison or UW-Milwaukee from the Chair of the Department of Physics. This letter will state that the students are eligible for a Dual Degree upon successful completion of their classes during that semester.
- Before supplying the letter, the Department chair should verify that all degree requirements, short of the physics classes, will be met with the completion of that semester.
- An electronic copy of the letter signed by the physics department chair should be sent to the students, the physics department chair, the UW-Whitewater dual degree coordinator, and the person responsible for reviewing transfer students at UW-Madison or UW-Milwaukee. A paper copy of the letter will be kept on file in the Physics Department.
- At the end of the semester, the Physics department chair should verify the successful completion of all courses by accepted dual degree students.

#### **UPON COMPLETION OF THEIR DEGREE (At UW-Madison or UW-Milwaukee):**

- Students should contact the registrar.

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**FOR MORE INFORMATION:**

UW – Whitewater info: <http://academics.uww.edu/physics/Engr4yr.php>

Dual Degree Coordinator: Prof. Bob Benjamin, [benjamir@uww.edu](mailto:benjamir@uww.edu), (262)472-5114

UW – Madison info: <http://studentservices.engr.wisc.edu/transfer/tips>

College of Engineering Transfer Coordinator: Bonnie Schmidt, [Schmidt@engr.wisc.edu](mailto:Schmidt@engr.wisc.edu)  
(608)262-4822

UW – Milwaukee info: [http://www4.uwm.edu/future\\_students/transfer/guaranteed\\_transfer/cfm](http://www4.uwm.edu/future_students/transfer/guaranteed_transfer/cfm)

College of Engineering Transfer Coordinator: Todd Johnson, [ceas-adv@uwm.edu](mailto:ceas-adv@uwm.edu),  
(414)229-4667