

UMBC UGC New Course Request: **GCSP 301 (or ENES 301)**

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Proposed Effective Date: Fall 2016

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**COURSE INFORMATION:**

Course Number(s)	GCSP 301 (or ENES 301)
Formal Title	Grand Challenges Orientation Seminar
Transcript Title (≤30c)	Grand Challenges Orientation
Recommended Course Preparation	N/A
Prerequisite <b>NOTE:</b> Unless otherwise indicated, a prerequisite is assumed to be passed with a "D" or better.	N/A
Credits	1
Repeatable?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Max. Total Credits	<sup>1</sup> This should be equal to the number of credits for courses that cannot be repeated for credit. For courses that may be repeated for credit, enter the maximum total number of credits a student can receive from this course. E.g., enter 6 credits for a 3 credit course that may be taken a second time for credit, but not for a third time. Please note that this does NOT refer to how many times a class may be retaken for a higher grade.
Grading Method(s)	<input checked="" type="checkbox"/> Reg (A-F) <input type="checkbox"/> Audit <input type="checkbox"/> Pass-Fail

**PROPOSED CATALOG DESCRIPTION** (no longer than 75 words):

This seminar provides students with an introduction and foundation for the National Academy of Engineering Grand Challenge Scholars Program. The NAE's Grand Challenges are 14 complex problems facing humanity, in the broad areas of sustainability, health, security, and the human mind. The topics for the seminar include the Grand Challenges themselves, ethical frameworks, Responsible Conduct of Research training, and initial creation of a GCSP e-portfolio. The seminar will also develop effective teamwork skills, including managing diversity and understanding implicit bias. Students will identify a particular Grand Challenge and focus area. *Permission required. Restricted to students who have been admitted to the Grand Challenge Scholars Program.*

**RATIONALE FOR NEW COURSE:**

The GC Orientation Seminar is part of a newly proposed Grand Challenge Scholars Program at UMBC that is under review by the National Academy of Engineering to become part of the NAE's nationwide GCSP. To apply to the program, students must have completed three semesters at UMBC (one semester for transfer students). Engineering and computing majors are expected to have completed their gateway requirements. As such, the seminars designed for students admitted to the program are appropriate for offering at the 300 and 400 level.

In their first semester after admission into the program, students will take this 1-credit seminar to understand the program requirements, begin developing the skills and knowledge they will need, and start to design their pathway through the program. The course will initially be taught once a year, in the fall, but may be repeated in the spring if there is a sufficiently large demand for spring entrance into the program. The Orientation Seminar is followed by two other seminars, the GCSP Program Seminar (GCSP 302, to be taken in the 2<sup>nd</sup> semester in the program) and the

GCSP Leadership Program (GCSP 401, to be taken in the 3<sup>rd</sup> or 4<sup>th</sup> semester in the program). The latter two seminars will be submitted for approval by the UGC at a later date.

All three seminars will be administered by the Dean's office in COEIT. However, the GCSP program is open to students from all departments and disciplines. Therefore, the GCSP course prefix is being requested as a unique designation for this interdisciplinary, campus-wide program. If the GCSP designation is not approved, we would use the ENES designation that already exists.

**ATTACH COURSE OUTLINE (mandatory):**

See attached syllabus.

**GCSP 301 – Grand Challenges Orientation Seminar  
Proposed Syllabus**

**Course Description**

This seminar provides students with an introduction and foundation for the National Academy of Engineering Grand Challenge Scholars Program. The NAE's Grand Challenges are 14 complex problems facing humanity, in the broad areas of sustainability, health, security, and the human mind. The topics for the seminar include the Grand Challenges themselves, ethical frameworks, Responsible Conduct of Research training, and initial creation of a GCSP e-portfolio. The seminar will also develop effective teamwork skills, including managing diversity and understanding implicit bias. Students will identify a particular Grand Challenge and focus area. *Permission required. Restricted to students who have been admitted to the Grand Challenge Scholars Program.*

**Overview of Course Structure**

The course includes three interleaved arcs: Grand Challenges, Curricular Themes, and Interpersonal Skills. The Grand Challenges arc explores each of the four GC areas (Sustainability, Healthcare, Security, and Learning and Education), using the textbook, *Abundance*, as the primary reading material. As part of this arc, students will present the main reading assignments in small groups of 1-3 students (depending on enrollment) in a short (10-minute) prepared presentation. The Curricular Themes arc explores the five requirements of the Grand Challenge Scholars Program (research, interdisciplinarity, entrepreneurship, global perspectives, and service learning), augmenting the textbook with supplementary reading and multimedia materials. This arc will conclude with the students presenting their individualized GC completion plan, identifying their selected Grand Challenge and sharing how they will meet each of the curriculum requirements. The Interpersonal Skills arc develops important personal and interpersonal skills for succeeding in the program, and will be tracked and assessed through written reflections.

Students' grades will be based on the following weights:

Class participation	35%
GC reading presentation	10%
GC portfolio presentation	15%
Written reflections	20%
E-portfolio	20%

**Textbook**

The primary textbook for the course is *Abundance: The Future is Better Than You Think*, by Peter H. Diamandis and Steven Kotler (Free Press, 2012). The textbook will be supplemented by additional readings and multimedia materials.

### Schedule of Topics

All students are responsible for completing the assigned reading before class (with the exception of the first class's assignment, which should be completed by the second week). Chapters of the *Abundance* textbook are referred to as "A#."

Week	Topic	Assigned Reading	Assignments and Notes
1	Introduction to the Grand Challenges	NAE Grand Challenges Report	
2	Designing Your GCSP Experiences	A1, "Our Grandest Challenge"	
3	Ethical Frameworks and Responsible Research	A2, "Building the Pyramid" A11, "The Technophilanthropists"	Reflection: RCR Training
4	Sustainability Challenges	A8, "Water" A13, "Energy"	
5	Global Perspectives; Diversity and Implicit Bias	A12, "The Rising Billion" Paragon of the Polygons	Reflection: Implicit Bias
6	Healthcare Challenges	A15, "Healthcare"	
7	Teamwork and Handling Conflicts	A7, "The Tools of Cooperation" Brounsten and Lau articles	Reflection: Teamwork Experiences
8	Security Challenges	Sanger article	
9	Entrepreneurship; Creating an E-Portfolio	A10, "The DIY Innovator" A18, "Risk and Failure"	Reflection: Creativity & Innovation
10	Learning and Education Challenges	A14, "Education"	
11	Service; Focusing Your GCSP Experiences: Selecting a Challenge	A15, "Freedom" A19, "Which Way Next?"	Reflection: Service & Science
12	Student Presentations		
13	Student Presentations		
14	Student Presentations		
15	Student Presentations		E-portfolio due

### Readings

Vi Hart and Nicki Case, Paragon of the Polygons: A Playable Post on the Shape of Society.  
<http://ncase.me/polygons/>

National Academy of Engineering, "Grand Challenges for Engineering," 2008.  
<http://engineeringchallenges.org/File.aspx?id=11574&v=ba24e2ed>

Marty Brounsten, “Ten Qualities of an Effective Team Member,” at [www.dummies.com](http://www.dummies.com) (from *Managing Teams for Dummies*).  
<http://www.dummies.com/how-to/content/ten-qualities-of-an-effective-team-player.html>

Edmond Lau, “Why and Where is Teamwork Important?” *Forbes*, January 23, 2013.  
<http://www.forbes.com/sites/quora/2013/01/23/why-and-where-is-teamwork-important/#2715e4857a0b465b208132d9>

David E. Sanger, “Nuclear Facilities in 20 Countries May Be Easy Targets for Cyberattacks,” *New York Times*, January 14, 2016.  
<http://www.nytimes.com/2016/01/15/world/nuclear-threat-initiative-cyberattack-study.html>

Reuters, “Group Claiming to Oppose ISIS Says It Committed Cyberattack on BBC,” *New York Times*, January 2, 2016.  
<http://www.nytimes.com/2016/01/03/world/europe/group-claiming-to-oppose-isis-says-it-committed-cyberattack-on-bbc.html>

Paul Rosenzweig, “A Bad News Report: We Can’t Do Cybersecurity. Period.” *Lawfare*, January 24, 2016.  
<https://www.lawfareblog.com/bad-news-roundup-we-cant-do-cybersecurity-period>

Jamie Morgan, “FDA Guidance Tackles Medical Device Cybersecurity Issues,” *H&HN*, January 22, 2016.  
<http://www.hhnmag.com/articles/6884-fda-guidance-tackles-medical-device-cybersecurity-issues>