



College of Engineering

Engineering Faculty Document No.:
123-25
October 22, 2025

TO: The Engineering Faculty
FROM: The Faculty of the Edwardson School of Industrial Engineering
RE: New graduate course – IE 58900: Assistive Technology Practice

The Faculty of the Edwardson School of Industrial Engineering has approved the following new graduate course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

FROM (IF ALREADY OFFERED WITH TEMPORARY NUMBER):

IE 59000: Assistive Technology Practice

Fall

3 total credits; Lecture

GR Standing OR Jr./Sr. Standing

See pg. 3

TO:

IE 58900: Assistive Technology Practice

Fall

3 total credits; Lecture

GR Standing OR Jr./Sr. Standing

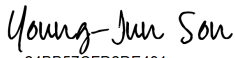
This course introduces rehabilitation engineering through the use, design, evaluation, and delivery of assistive technology (AT) for persons with disabilities. Students will learn about the pathophysiology of different categories of disabilities and their impact on daily living, educational, and occupational activities and explore a range of AT devices employed by each group. A theoretical framework will be taught on how to assess the AT needs of individuals with disabilities, determine how to match appropriate AT features with individual consumer needs and preferences, and evaluate the usefulness of novel AT solutions. Also important is to become familiar with the major laws and policies that affect accessibility and the provision of AT. Guest lectures and demonstrations will be offered to provide greater understanding of topic areas. Students will be required to devise and evaluate a conceptual AT solution for a chosen disabling condition and activity.

RATIONALE:

This course has been offered for many years as graduate elective course. It is complementary to many existing IE Human Factors courses (IE 57700, IE 57800, IE 55600, etc.), and has become a

popular elective-type course among students interested in Human Factors Engineering at the undergraduate and graduate level.

DocuSigned by:


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Young-Jun Son

Head of the Edwardson School of Industrial Engineering

Link to Curriculog entry: <https://purdue.curriculog.com/proposal:30477>

Term	Enrollment
Fall 2012	5
Fall 2013	5
Fall 2014	9
Fall 2015	16
Fall 2016	21
Fall 2017	24
Fall 2018	11
Fall 2019	7
Fall 2020	16
Fall 2021	13
Fall 2022	9
Fall 2023	10
Fall 2024	9
Fall 2025	10

CLASS ORGANIZATION INFORMATION

<u>IE 59000AT</u> Course No.	<u>Assistive Technology Practice</u> Course Name	<u>Fall</u> Semester	<u>2024</u> Year
Course Credit is:	Lecture <u>3</u> Laboratory _____ Clinic _____ Other _____		
Course Meets:	Lec. 1:30-2:45 PM, TTh, MJIS room 1083 _____ Clinic _____ Other _____		

Instructor-of-Record for this Course: Dr. Brad Duerstock, bsd@purdue.edu, Rm. 1081 FLEX

Formal Laboratories: No. of Instructors Present N/A No. of Students Present N/A

Recommended text: Cook & Hussey's Assistive Technologies, 3rd Edition, Authors: Cook & Polgar, 2007, ISBN: 9780323039079

Grade in Course is Based on (% for each):

<u>250</u>	Short Quiz	<u>180</u>	Oral Reports	<u>10</u>	Attendance/guest lecture
	Hour Exams		Written Reports		Attitude & Motivation
	Final Exam		Lab. Perform.		Other _____

Distribution Points for Letter Grades (if Pass-Not Pass Define "C" Level).

GPA	Grade	Percent Range
	A+	100 – 98
4	A	97 – 94
3.7	A-	93 – 90
3.3	B+	89 – 87
3.0	B	86 – 83
2.7	B-	82 – 80
2.3	C+	79 – 77
2.0	C	76 – 73
1.7	C-	72 – 70
1.3	D+	69 – 67
1	D	66 – 60
0	F	≤59%

Policy on Academic Dishonesty. [Academic dishonesty is defined as an intentional act of cheating and deceit while fulfilling academic requirements as a Purdue student. Plagiarism, fabrication of information, the use of substitutes for taking examinations, the use of unauthorized cribs, copying during examinations, and impermissible collaboration on assignments are examples of academic dishonesty. Also, to aid and abet other students in committing these dishonest acts is considered academic dishonesty (from SVM Admin. Doc. #20; after University Regulations, 1995-96, Part V, Section III-B-2-a, page 45)].

Students who are dishonest during examination will receive an F for the examination.

Policy on Make-up Examinations:

Make-up for excused absences only. In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control.

COURSE DESCRIPTION:

This course introduces rehabilitation engineering through the use, design, evaluation, and delivery of assistive technology (AT) for persons with disabilities. Students will learn about the pathophysiology of different categories of disabilities and their impact on daily living, educational, and occupational activities and explore a range of AT devices employed by each group. A theoretical framework will be taught on how to assess the AT needs of individuals with disabilities, determine how to match appropriate AT features with individual consumer needs and preferences, and evaluate the usefulness of novel AT solutions. Also important is to become familiar with the major laws and policies that affect accessibility and the provision of AT. Guest lectures and demonstrations will be offered to provide greater understanding of topic areas. Students will be required to devise and evaluate a conceptual AT solution for a chosen disabling condition and activity.

COURSE OBJECTIVES:

Acquire information covering a wide array of disabilities and their AT needs. Learn how to assess the needs and preferences of potential AT users to recommend specific equipment or services. Recognize the advantages of using a team approach for in-depth AT assessments and recommendations. The information presented during this course should provide a foundation of knowledge applicable for taking the Assistive Technology Professional (ATP) certification exam offered through the Rehabilitation Engineering Society of North America (RESNA).

COURSE PROJECT (150 Points):

A class project is required of students to research, user assess, conceive, and evaluate a conceptual AT device or accommodation. The purpose of this exercise is to assess students' understanding of rehabilitation engineering concepts presented throughout this course and challenge their problem-solving abilities. This conceptual AT device or accommodation does not have to be high-tech but grounded in current available technologies (i.e. tractor beams and teleportation have not been invented yet).

The class project will consist of five sections due at certain times of the semester (see the syllabus for due dates). Each section will culminate in turning in a written document, which will be combined to form a final AT research proposal. Each section will be graded independently with the final score reflecting the total of these section scores.

1 point will be deducted from the total score of each section for every day it is past the deadline.

The format requirements for each document are **single-spaced with 1 inch margins and written using Calibri, 12 point font or Arial, 11 point font.**

1. **Problem Ideation (15 points):** In the first section use 1-2 paragraphs to describe the specific disability type and activity for development of a conceptual AT device or accommodation. Describe in detail what are the impairments faced by persons with this disability and which ones are you focusing to accommodate with your AT solution. Proposing a detailed AT product/solution is not necessary at this time.

Grading criteria: Description of target users with disabilities 5 pts., Definition, originality and feasibility of activity to be performed 8 pts., Technical writing skill 2 pts.

2. **Literature Review (30 points):** This section will consist of researching what has been done in the past for your chosen disability and AT solution. Exploration of current AT solutions will help determine the design concept of your proposed novel AT device or accommodation. Discussion of current AT must include references and if appropriate, figures. Background research should include what has been used before and presently to assist this disability/impairment or need. Figures are helpful. During this time, the disability type or service selected during the first section (1.) may be revised in this section.

This is commonly a 5-6 pages, single-spaced document with citations. Grading criteria: Depth of literature review 15 pts., Relevance to proposed AT solution 10 pts., Technical writing skill 10 pts.

3. **Customer Discovery (40 points):** Describe your target client with the disability that you have chosen previously. Interview at least three individuals that can identify with that target user. This could be an individual with that specific disability, a caregiver, physician, occupational and/or physical therapist, someone at association or agency that serves these disabilities. You must describe these experts and their relationship to this disability type and what information they have to offer.

This document should include your questions with experts and summary of their responses. Grading criteria: Relevance of interviewee experience to your problem 15 pts., Quality and depth of interviews related to proposed AT solution 20 pts., and writing skill 5 pts.

4. **User AT assessment (30 points):** Create a your ideal client employing the five-point strategy discussed during the User AT assessment lecture incorporating parts A, B, C, D, and E. Thoroughly describe the specific activities that you intend your hypothetical client requires from this AT solution, the environment, and any other contextual information for a detailed user assessment. You do not need to supply a lot of details that is irrelevant for that user or personal information that you don't have. This section is worth 6 points for each of the 5 parts.
5. **Solution Innovation (35 points):** The next section is to describe your proposed, novel AT device or accommodation based on previously assessed user specifications and needs. As a conceptual design it must include:
 - the specific functions of the AT,
 - how it would be used by your target group (persons with particular disabilities),
 - what are its user requirements and restrictions, and
 - how would you propose to make or construct this AT. Drawings or figures are important.

Your proposed design must be feasible (e.g. no flying wheelchairs) or based on research that is currently being done by others (e.g. brain-controlled interface).

This document should be 6-8 pages with concept AT diagrams. When possible, cite and include published data to support the innovativeness of your design. Grading criteria: Technical description of AT solution 10 pts., Technical feasibility of proposed AT solution 10 pts., Improvement upon similar products 10 pts., Innovativeness 5 pts.

6. **Evaluation Plan (30 points):** The last task is to develop an evaluation plan that validates the utility of your proposed AT. Testing may include comparison to other commercial AT using a House of Quality based on typical engineering design criteria, user-based interviews, usability measures, cognitive walk-throughs, GOMS, task performance measures, estimated cost analysis, quality of life, or other methods. You should describe at least three assessment tests with anticipated results.

This document is commonly 6-8 pages long. Grading criteria: Depth of assessment strategy 15 pts., Relevance of assessments to proposed AT solution 10 pts., Technical writing skill 5 pts.

COURSE MATERIALS:

Recommended text: Cook & Hussey's Assistive Technologies, 3rd Edition, Authors: Cook & Polgar, 2007, ISBN: 9780323039079

Suggested materials: Fundamentals in Assistive Technology, 4th Edition, Ed. Michelle L. Lange, RESNA <https://members.resna.org/webapps/displayItem.htm?acctItemId=27>

Online resources: Lecture slides and other class materials found on Purdue Brightspace.

GRADING POLICY:

Students will be evaluated not only on the course content from lectures and from course readings through exams, but also on their performance on an individual AT project activity. There are three mid-term exams (non-cumulative) covering the class lecture materials. The exams will consist primarily of multiple choice

questions with true/false and short answer questions as well. The class project will total 150 points over the course of the semester. Late submissions will result in a one point deduction for every day past the deadline.

IE 590AT CLASS SCHEDULE FALL 2024

<u>Date</u>	<u>Topic</u>	<u>Deadlines</u>	<u>Instructor</u>
<u>Week 1</u>			
Aug. 20, Tue	Definitions and classification of AT		Duerstock
Aug. 22, Thu	HAAT model for AT delivery & Theoretical AT User Assessment		Duerstock
<u>Week 2</u>			
Aug. 27, Tue	Physiology of the Disabled AT user: Motor Impairments		Duerstock
Aug. 29, Thu	Physiology of the Disabled AT user: Visual Impairments		Duerstock
<u>Week 3</u>			
Sept. 3, Tue	Physiology of the Disabled AT user: Hearing loss	Project Part 1 Due: Problem ideation	Duerstock
Sept. 5, Thu	Practical AT User Assessment		Stephen Swain
<u>Week 4</u>			
Sept. 10, Tue	Physiology of the Disabled AT user: Cognitive Impairments		Duerstock
Sept. 12, Thu	EXAM I		
<u>Week 5</u>			
Sept. 17, Tue			
Sept. 19, Thu	Occupational therapy in healthcare	Project Part 2 Due: Literature research	TBD
<u>Week 6</u>			
Sept. 24, Tue	Workplace accommodations for employees with disabilities		Josh Anderson, Easterseals Crossroads
Sept. 26, Thu	Mobility aids		TBD
<u>Week 7</u>			
Oct. 1, Tue	AT for the deaf or hard of hearing		Shireen Hafeez

<u>Date</u>	<u>Topic</u>	<u>Deadlines</u>	<u>Instructor</u>
Oct. 3, Thu	Web Accessibility		TBD
<u>Week 8</u>			
Oct. 8, Tue	October break		
Oct. 10, Thu	Wheelchair seating, bedding and lift systems		TBD
<u>Week 9</u>			
Oct. 15, Tue	Environmental control for persons with disabilities	Project Part 3: Customer discovery	TBD
Oct. 17, Thu	Exam II		TBD
<u>Week 10</u>			
Oct. 22, Tue	Hearing loss and hearing aid technology		Joshua Alexander, Dept. of Speech, Language, & Hearing Sciences
Oct. 24, Thu	Assistive Technology Center & accommodations for students with disabilities		David Schwarte
<u>Week 11</u>			TBD
Oct. 29, Tue	Electronic aids for daily living		
Oct 31 Thu	Public accessible transportation	Project Part 4: AT user assessment section due	
<u>Week 12</u>			
Nov. 5, Tue	Personal accessible transportation		
Nov. 7, Thu	Architectural accessibility		TBD
<u>Week 13</u>			TBD
Nov. 12, Tue	Alternative and Augmentative Communication (AAC)		
Nov. 14, Thu	Prosthetics & Orthotics		
<u>Week 14</u>			
Nov. 19, Tue	AT in education and recreational activities	Project Part 5: Solution innovation development	
Nov. 21, Thu	THANKSGIVING HOLIDAY		
<u>Week 15</u>			
Nov. 26, Tue	Assistive Robotics		Duerstock
Nov. 28, Thu	EXAM III		
<u>Week 16</u>			
Dec. 3, Tue.	AT for leisure activities		Duerstock

Dec. 5, Thu Future of transportation for persons
with disabilities

Phill Bell, BraunAbility

Finals week

Tue.

**Project Part 6: Evaluation
section with the previous
sections due**

