AsTeRICS Academy

Module Description

Vienna Summer School for
Assistive Technology 2015

> Technology is exciting.

Table of Content

1. Course Overview

The AsTeRICS Academy Summer School for Assistive Technology offers a versatile compilation of courses and lectures, taught by a group of internationally renowned experts in the fields of AT, web accessibility and Augmentative & Alternative Communication. Each day of the summer school program is dedicated to a specific topic and during the last 3 days people can apply the collected knowledge from course modules and hands-on workshops in their implementation of small group projects.

	07.13.15 MO	07.14.15 DI	07.15.15 MI	07.16.15 DO	07.17.15 FR	07.18.15 SA	07.19.15 SO	07.20.15 MO	07.21.15 DI
Morning session 9:00-12:00	**AsTeRICS Academy Team** Opening and Lab Tour Assistive Technology Introduction and Tools	**Shadi Abou Zahra** Web accessibility: Basics and evaluation	**Therese Willkomm** Assistive Technology in Minutes	**Benjamin Aigner** Arduino-based affordable AT-solutions	**Daniel Sturmair** Platus AAC tools The Grid			**Project Groupwork**	**Project Groupwork**
Afternoon session 13:00-17:00	**Veronika David & Martin Deinhofer** AsTeRICS Installation	**Steve Lee** GPII and Mozilla Appmaker	**Therese Willkomm** AT-Switches **Gerhard Nussbaum** Game Accessibility	**Chris Veigl** EMG, ECG, EEG: Bioelectric signals for AT-solutions	**Project Groupwork**			**Project Groupwork**	**Project Presentations** **Closing EVENT**

The total ECTS points quoted for the Summer School courses is **3.0 ECTS** (for a description of the European Credit Transfer System ECTS please refer to http://ec.europa.eu/education/ects/ects_en.htm). Please note that a learning effort of 25 hours is calculated per ECTS point (49 out of 75 hours are covered in lectures/workshops with physical presence at the UAS Technikum Wien, the remaining 26 hours are dedicated to preparation at home). If you are studying outside Europe please contact the legal department of your university for information how to transfer ECTS to your local crediting system.

2. Course Details

2.1. Assistive Technology Introduction

Course Title	**Assistive Technology Introduction**
ECTS	0.25
Lecturer	Veronika David / Martin Deinhofer
Course Methods	Lecture
Course Description	In this lecture, the students will learn to outline different types of disabilities including typical impairments. The lecture gives a good overview on Assistive Technology devices in general, with a special focus on ICT-enabled devices and solutions for people with special needs. In a second session, the Assistive Technology Rapid Integration and Construction Set (AsTeRICS) will be introduced and the students will be able to do first hands on exercises with the framework.
Infos / Links	http://www.asterics.eu/

2.2. Web Accessibility Module

Course Title	**Introduction to Web Accessibility**
ECTS	0.25
Lecturer	Shadi Abou Zahra
Course Methods	Lecture, hands-on demonstration
Course Description	Introduction to web accessibility for people with disabilities, and its usability benefits for everyone. In this course you will learn the basic principles of web accessibility and how to apply and check these principles in practice. After this course you will be able to answer these questions: • How do people with disabilities use the Web? • What is web accessibility and why is it important? • Who is affected and what is the business case? • What other benefits does web accessibility have? • How can I check how accessible my website is? • How can I make my website more accessible? • What is the role of different W3C/WAI standards? Where can I find resources and tools to help me?
Infos / Links	W3C Web Accessibility Iniative (WAI): http://www.w3.org/WAI/

Web Accessibility Module (continued)

Course Title	**Web Accessibility and Frameworks**
ECTS	0.25
Lecturer	Steve Lee
Course Methods	Lecture, hands-on demonstration
Course Description	Building on what you learned in '**Web Accessibility Basics and Evaluation**', you'll learn about the impact and opportunities for accessibility when using dynamic HTML with Javascript. You'll look at frontend frameworks and Web Apps and learn about the GPII accessibility infrastructure's personalization. • Dynamic accessibility - web apps and javascript • Custom controls and web components • WYSIWIG editors • Progressive enhancement as a design approach • Mozilla App Maker – building personalized apps with from web components • The GPII approach to automatic personalisation from preferences For a hands on we'll explore Mozilla AppMake that builds on Web components to provide a framework for creating simple apps. The GPII will be demonstrated.
Infos / Links	WAI, Javascript, Web components GPII APfP

2.3. Affordable Assistive Technology Construction Module

Course Title	**Construction of Low Cost Assistive Tools**
ECTS	0.5
Lecturer	Therese Willkomm
Course Methods	Workshop
Course Description	This interactive workshop will explore over 50 everyday items, tools, and materials for creating hundreds of AT solutions in five minutes or less and for $5 or less and without the need for power tools. Learn how to become a spontaneous problem solver by looking at and using everyday items in extraordinary way. • Amazing uses for ordinary items • Re-purpose and recycle materials and items into incredible A.T. solutions • Creating A.T. solutions by looking at the challenge differently • Using materials like Instamorph, Dual Lock, PVC pipes, Uglu, Loc-Lift RG, Koffler soft pebble tape, Hold-It, Velcro Brand products like Veltex, Stickyback and much more to create creative AT-solutions • Discover the top 10 "must have" basic hand tools and the multiple uses for these tools. Each participant will fabricate three different assistive technology solutions using everyday materials.
Infos / Links	

2.4. Bioelectric Signal Processing Module

Course Title	**Microcontroller Basics**
ECTS	0.25
Lecturer	Benjamin Aigner
Course Methods	Lecture, hands-on demonstration
Course Description	This lecture introduces the famous Arduino development environment and shows examples of firmware programming including: • Serial communication • Interfacing switches, controlling leds / actuators • Using USB HID device functions (Mouse / Keyboard) • Using the OpenEEG P2 firmware for sending analoge values to the AsTeRICS framework As a hands-on example, the Flexible Assistive Button Interface (FABI) will be used together with the low-cost switches manufactures in the low cost AT-construction sessions by Therese Willkomm.
Infos / Links	Arduino IDE, Teensy microcontroller, Fritzing, Switch interface, HID device, AsTeRICS, FABI

Bioelectric Signal Processing Module (continued)

Course Title	**Signal Acquisition and Processing**
ECTS	0.25
Lecturer	Chris Veigl
Course Methods	Lecture, hands-on demonstration
Course Description	In this course, the basics of bioelectric signal processing will be presented. The covered topics include: • Physiological foundations of bioelectric signals: nerve cells and action potentials • Analog amplification and signal conditioning • ADC-conversion and sampling • Digital filters, feature extraction and classification methods • Brain Computer Interfaces (µ-rhythm, P300, ..) In an hands-on part which builds upon the Microcontroller Basics module by Benjamin Aigner, an EMG / ECG measurement will be performed in small groups, using the AsTeRICS framework for signal processing.
Infos / Links / references	Arduino, Olimex ECG/EMG shield, AsTeRICS, BrainBay, OpenVibe

2.5. Augmentative & Alternative Communication Module

Course Title	**AAC Basics and Products**
ECTS	0.25
Lecturer	Daniel Sturmair
Course Methods	Lecture, hands-on demonstration
Course Description	Augmentative and Alternative Communication (AAC) and it's relation to Assistive Technology (AT) are the priorities of this course. First, AAC and the users who can benefit from it will be introduced, and an overview of the range of tools currently available will be given. Then we take a detailed look into the software "The Grid" and it's possibilities, including communication in word and symbol, computer control and environmental control. You will have the possibility to set up a working AAC-system and test several options.
Infos / Links	Platus Learning GmbH, The Grid, Sensory Software

2.6. Project Work

Course Title	**Project Work**
ECTS	1.0
Lecturer	Chris Veigl / Benjamin Aigner / Veronika David / Martin Deinhofer
Course Methods	Workshops in small groups
Course Description	The project development phase of the AsTeRICS Academy Summer School program allows the participants to choose from a number of suggested projects and use cases and to implement complex assistive solutions in small groups. All covered materials and methods explored in the previous days of the summer school can be used. The offered topics include: • Accessible gaming using switches or special sensors • Environmental control solutions (infrared, KNX, etc.) • Speech based systems (recognition / synthesis) • AAC solutions / scanning and special On-Screen Interfaces • Camera-based systems / computer vision • Biosignal based input methods • Biofeedback / audio-visual representation The project development phase will be concluded with the final group presentations.
Infos / Links	http://www.asterics.eu

3. Introducing the Lecturers

International Guests:

3.1. Steve Lee

Steve Lee is a consultant, developer, writer and event organiser in open development with a particular interest in the enabling power of the union of open source, accessibility, web and mobile technologies. His personal mission is to bring users, developers and others together through open development to create innovative and meaningful technology solutions using appropriate technologies and standards. His expert technical knowledge covers accessibility- and assistive technologies infrastructure and tools on Mobile, Web, Microsoft Windows, Linux as well as software development for Internet/web client/server development.
Steve Lee is co-founder and programme lead of opendirective.com which fosters open development, open innovation and community engagement in open accessibility.
Prior to that, Steve worked as freelance Open Source Assistive Technology Developer, Web developer and technical author (fullmeasure.uk, schoolforge.org.uk & www.oatsoft.org) and an advisor for the JISC funded OSS Watch.

3.2. Daniel Sturmair

Daniel Sturmair graduated the “IT- & Management” college in 2000 and holds an MBA for management for medical devices from WWEDU, Austria.
As founder and managing director of the IT company “Sturmair und Siegele OEG”, Daniel Sturmair developed a system for people without own voice and worked exclusively with larynx-patients.
In 2008, he joined the company “Platus Learning Systems GmbH” as shareholder and CEO. His objective is to make Platus the leading company in Austria for Alternative and Augmentative Communication (AAC) and Assistive Technology (AT).
He worked as an IT-manager and as project manager for the development of AAC devices, built up sales structures in several countries, and since 2008 works as managing director of Platus Learning Systems GmbH. In his spare time he works as a lecturer at various schools and technical colleges.

3.3. Gerhard Nussbaum

Gerhard Nussbaum is project manager and technical engineer at the KI-I. He studied computer science at the Johannes Kepler University Linz and graduated with distinction in 2003. During his work at the KI-I he is and was involved in numerous national and international founded projects in the area of e-inclusion. He was speaker at various international conferences (e.g. AAATE, ICCHP, ICOST, etc.) and is member of the scientific committees of the international conferences ICCHP, ICTA and DSAI. His current research work is related to the use of ICT to enable the integration of people with disabilities that concerns the field of Assistive Technology as well as accessibility and usability of modern ICT including the Internet. His special fields of research are smart environments, environmental control and mobile computing.

3.4. Therese Willkomm

Therese Willkomm, PhD, is the Director of New Hampshire's State Assistive Technology Program with the Institute on Disability at the University of New Hampshire (UNH) and is an associate professor in the Department of Occupational Therapy.Dr. Willkomm is known nationally and internationally as "The MacGyver" of Assistive Technology and has designed and fabricated thousands of solutions for individuals with disabilities including her patented "A.T. Pad Stand", a multiuse assistive technology mounting device. She is also known throughout the county for her trainings on awesome iPAD apps and adaptations. She has presented her work in 42 states, seven foreign countries and three U.S. Territories; has written 22 assistive technology related publications including her new book titled: "Assistive Technology Solutions in Minutes – Book 2"

3.5. Shadi Abou Zahra

Shadi Abou-Zahra works with the W3C Web Accessibility Initiative (WAI) as Activity Lead of the WAI International Program Office, which includes groups that are responsible for education and outreach, coordination with research, general discussion on web accessibility, coordination with the WAI Technical Activity, and WAI liaisons with other organizations including standards organizations and disability groups. Shadi coordinates WAI outreach in Europe, accessibility evaluation techniques, and international standards promotion and harmonization activities. He is the scientific coordinator of the WAI-DEV Project (IST 611612), chairs the Evaluation and Repair Tools Working Group (ERT WG), is the staff contact of the Research and Development Working Group (RDWG), and is a participant and editor for the Education and Outreach Working Group (EOWG).

Lecturers of the UAS / AsTeRICS Academy Team:

3.6. Benjamin Aigner

Benjamin Aigner started his studies in the bachelor program „Electronic Engineering“ at the UAS Technikum Wien in 2010 and continued with the master program „Embedded Systems“ from 2012 to 2014. In August 2012 he started working as employee within the AC-Centrope II project. His employment continued with the modulAAR project from January 2013 until August 2013. Since September 2013 he is employed within the „AsTeRICS Academy“ and the „ViTAL“ project. In addition to project related research, he is holding courses covering different aspects of electronic/electrical engineering, embedded systems and Assistive Technologies.

3.7. Veronika David

Veronika David studied Biomedical Engineering at the UAS Technikum Wien. After the Bachelor Degree she graduated in the master program Healthcare and Rehabilitation Technology in 2012. The main focus during her studies lied on Rehabilitation Technology and Ambient Assisted Living. In October 2012 she joined the Department of Biomedical Engineering at the UAS Technikum Wien where her major activities are research and development in the area of Rehabilitation Technology, Ambient Assisted Living and Gait Analyses. Since September 2013 she is part of the AsTeRICS-Academy team working in the area of Assistive Technologies in the Department of Embedded Systems. She is doing her PhD in course of the research project MISTRAAL (Mobile instrumented stroke rehabilitation in AAL) at the Medical University of Vienna.

3.8. Martin Deinhofer

After graduation at the HTL St. Pölten (Department of Informatics) 1997, he worked in several companies as a software developer (Java, Linux) for network management systems and traffic control systems. He started his studies in Sports Equipment Technology at UAS Technikum Wien in the year of 2007. Afterwards he graduated in the master program Healthcare and Rehabilitation Technology. During his studies Martin Deinhofer focused on several projects using sensors (IMU, WiiMote, Kinect,...), pattern recognition (HMM, LDA,...) and functional electrical stimulation (FES). Since September 2013 he is part of the AsTeRICS-Acedamy team and working on projects in the area of assistive technologies. He is one of the contributors to the AsTeRICS framework and has held several workshops in Prague and Kyzylorda, Kasachstan.

3.9. Chris Veigl

Chris Veigl holds a master degree from the Technical University of Vienna where he studied Information Engineering and Medical Informatics. He joined the Technikum Wien Department of Embedded Systems in Sept. 2007, were he established the Assistive Technology and Smart Home focus. Starting with the AsTeRICS EU project, where Chris Veigl was responsible for the technical management, several follow-up projects in the AT and AAL sector could be successfully accomplished. Chris presented and applied AT-solutions in various workshops around the world, including countries like Nepal, Buthan and Zimbabwe and the US. His expertise includes software and firmware development, system architecture design, as well as implementation of hardware/software solutions and interfaces using various technologies.
In his teaching activity, Chris Veigl holds courses for microcontroller programming, operating systems and selected AT-related topics as well as workshops for building interactive art sculptures and biofeedback-based art installations.