

**COV885: Special Module in Computer Applications**  
**II Semester 2020-21**

**Name of course:** **Creating Accessible Documents for Visually Impaired**  
**Course level:** PG - Senior and Research ; Working professionals  
**Instructor:** Prof. Volker Sorge and Prof. M. Balakrishnan  
**Discipline:** Information Technology  
**Lecture hours:** 14 Hours  
**Pre-requisites:** Programming, Data Structures  
**Duration:** 31<sup>st</sup> March to 20<sup>th</sup> April 2021 (Dates and timings in the next page)

**Course Description:** Persons with visual impairments are still underrepresented due to inaccessibility of the STEM (Scientific, Technical, Engineering, and Mathematical) content. STEM document contains a number of artefacts like table, equations, diagrams, data visualization, etc. that remain inaccessible as screen readers have primarily focused on plain text. This course will focus on conversions of various artefacts from inaccessible formats to accessible formats. Here, accessibility means access to persons with visual impairments with assistive technologies like screen reader.

Syntactic and semantic analysis are required for the accessibility of the tables and equations. Syntactic analysis is required to understand the mathematical relations between the different variables of the equation. On the other hand, semantic analysis is required to adapt the audio rendering on the basis of the context to minimize the verbosity and cognitive load. Further, individual user specific adaptations are required to enhance effectiveness as well as efficiency of audio rendering. Such adaptations should be based on the individual user's experience with audio rendering as well as familiarity with the content.

**Course Contents** (# of lecture hours)

Topic	Contents	# of hours
Introduction	STEM Documents and their features	1.5
Document sources	Retro-digitized, born digital and born accessible	1.5
Formats and conversion	Physical (paper) and digital and associated conversion challenges	1.5
Semantics	Representation, generation and recovery techniques	3
Physical and other accessibility techniques	Braille, tactile, audio-tactile and haptics	1.5
Electronic accessibility	Screen reading, interaction & sonification	3
Personalization	Adaptations including impairment specific and localization	1.5

**Lab component** (if relevant)

**There would be a supplementary laboratory component. Details are available at**  
<http://progressiveaccess.com/empower18/>

This would expose the students to creating accessible equations, chemistry diagrams, physics diagrams and statistics. On the whole focus would be on generating accessible diagrams.

**Software tools & resources:**

- MathJax
- MathJax A11y extension
- Speech Rule Engine
- Pandoc
- BrailleR package

**Reference:**

Mainly research papers – key conferences ICCHP and CSUN  
Thesis of Dr. T.V. Raman, ACM Dissertation Award, Cornell University, 1994

Class Schedule - COV885

S.No.	Date	Day	IST	UK Summer Time	Topic
1	31-Mar-21	Wednesday	5:00 - 6:30 PM	12:30 - 2:00 PM	
	2-Apr-21	Friday			Good Friday Holiday
2	3-Apr-21	Saturday	5:00 - 6:30 PM	12:30 - 2:00 PM	Friday Time Table
3	6-Apr-21	Tuesday	5:00 - 6:30 PM	12:30 - 2:00 PM	
4	7-Apr-21	Wednesday	5:00 - 6:30 PM	12:30 - 2:00 PM	
5	9-Apr-21	Friday	5:00 - 6:30 PM	12:30 - 2:00 PM	
6	13-Apr-21	Tuesday	5:00 - 6:30 PM	12:30 - 2:00 PM	
	14-Apr-21	Wednesday			No class day
7	16-Apr-21	Friday	5:00 - 6:30 PM	12:30 - 2:00 PM	
8	17-Apr-21	Saturday	5:00 - 6:30 PM	12:30 - 2:00 PM	Wednesday Time Table
9	20-Apr-21	Tuesday	5:00 - 6:30 PM	12:30 - 2:00 PM	
	21-Apr-21	Wednesday			Ram Navmi Holiday
	23-Apr-21	Friday	5:00 - 6:30 PM	12:30 - 2:00 PM	Buffer Day