ONTOGRAPHY DESIGN  (2021 Fall at UT AUSTIN iSCHOOL)

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SPECIAL AMBASSADOR, GLOBAL iSCHOOLS

INSTRUCTOR BIO
Sam Oh is a Professor at SONGKYUNKWAN UNIVERSITY (SKKU, established in 1398) in Seoul, Korea and an Affiliate Professor at UNIVERSITY OF WASHINGTON (UW) iSCHOOL. Prior to joining SKKU, he taught at the UW iSchool for 4 years. His expertise includes Data modeling, Metadata and Ontology design, Data analytics, and Knowledge management. He has consulted many companies and government sectors in Korea. He is a Past Chair and Special Ambassador of Global iSchools and a Current Chair of DCMI Governing Board. He also chaired both TC46/SC9 (Identification & Description) for 6 years and ISO/IEC JTC1 SC34 (Document Description and Processing Languages) for 9 years. He TAUGHT CLASSES at the iSchools such as SYRACUSE, PITTSBURGH, UT AUSTIN, and UNC at CHAPEL HILL.

COURSE DESCRIPTION
The first part of this course covers essential knowledge needed to CREATE SOUND and INTEROPERABLE METADATA SCHEMAS AND THEIR APPLICATION PROFILES (APs), which provide the bases for metadata interoperability. Designing metadata schemas and their APs will be done using XML Editors. Its focus will be on how to achieve syntactic interoperability among diverse metadata. The second part of the course will be focused on providing students with in-depth knowledge of how to DESIGN AND IMPLEMENT SOUND ONTOLOGIES for SEMANTIC SYSTEMS. Particular attention will be given to SMART USE of METADATA LANGUAGES such as RDF/OWL (W3C STANDARD) and TOPIC MAPS (ISO STANDARD). In a summary, this course will be focused on designing and implementing interoperable metadata and ontology schemas using XML and Ontology Editors. However, it will not deal with developing interfaces of those systems, so programming skills are not required for this class.

COURSE OBJECTIVES
The purpose of this course is to provide students with conceptual and technical knowledge needed in designing interoperable metadata and ontology schemas. The specific objectives of this course are as follows:

- Students will acquire understanding of major STANDARD METADATA SCHEMAS available (DC, MODS, VRA, MIX, textMD, PREMIS, and METS)
- Students will be able to use an XML Editor to design and implement complex metadata schemas and their APs.
- Students will learn how to package diverse metadata using METS.
- Students will learn ONTOLOGY LANGUAGES such as Topic Maps (ISO 13250) and RDF/OWL (W3C Recommendation)
- Students will be able to design sound ontologies using Topic Maps.
- Students will be able to design sound ontologies using RDF/OWL.
- Students will acquire competent understanding of the ONTOLOGY DESIGN METHODOLOGY.

TEACHING METHODS
- ALL THE CLASSES WILL BE RUN AS SYNCHRONOUS CLASSES. THESE LECTURES WILL BE RECORDED AND AVAILABLE IMMEDIATELY AFTER THE CLASS FOR REVIEW.
- THE CYBER OFFICE HOUR WILL BE HELD TO ASSIST PROJECTS. THIS SESSION IS ONLY FOR THOSE WHO HAVE QUESTIONS AND NEED HELP. ATTENDANCE TO THIS SESSION IS OPTIONAL.

GRADING:
- Presenting METADATA SPECIFICATIONS (5%)
- Project 1: Designing a DUBLIN CORE APPLICATION PROFILE (10%)
- Project 2: Designing a MODS APPLICATION PROFILE (10%)
- Project 3: Designing a VRA APPLICATION PROFILE (10%)
- Project 4: Designing a METS APPLICATION PROFILE (15%)
- Project 5: Designing a Topic Maps Ontology (25%)
- Project 6: Designing an RDF/OWL Ontology (25%)
## Proposed Schedule

**Live Class Time:** Tuesday 6:30 PM – 9:30 PM CST

<table>
<thead>
<tr>
<th>Module/Date</th>
<th>Topics to Learn</th>
<th>Projects and Reading Dues</th>
</tr>
</thead>
</table>
| Module 1 8/31 (Tuesday) 6:30-9:30 PM | **Topics**  
  - Course Overview  
  - Lecture on Metadata Basics  
  - Lecture on XML Schema Syntax 1 | **Reading 1** |
| Module 2 9/7 (Tuesday) 6:30-9:30 PM | **Topics**  
  - Lecture on XML Schema Syntax 2  
  - Designing XML Schema (General)  
  - Lecture on Dublin Core (DC)  
  - Designing and Implementing a DC Schema (Simple Method) | **Reading 2** |
| Module 3 9/14 (Tuesday) 6:30-9:30 PM | **Topics**  
  - Designing and Implementing a DC Schema (Professional Method)  
  - Designing and Implementing a DC Application Profiles | **Reading 2** |
| Module 4 9/21 (Tuesday) 6:30-9:30 PM | **Topics**  
  - Metadata Object Description Schemas (MODS)  
  - Student Presentation: MODS Specs and Use Cases (Group 1)  
  - Designing and Implementing a MODS Schema | **Reading 3** |
| Module 5 9/28 (Tuesday) 6:30-9:30 PM | **Topics**  
  - Designing and Implementing a MODS-AP | **Reading 3** |
| Office Hour 10/4 (Mon) 6:30-8:00 PM | **Cyber Office Hour**  
  - Any student who has a question regarding the lectures or projects is welcome.  
  - Attendance to this session is optional. | **Run by Sunny Han** |
| Module 6 10/5 (Tuesday) 6:30-9:30 PM | **Topics**  
  - Visual Resource Association (VRA)  
  - Student Presentation: VRA Specs and Use Cases (Group 2)  
  - Designing and Implementing a VRA Schema  
  - Designing and Implementing a VRA-AP | **Project 1: DC-AP**  
  Due: 10/5 (Tue) 11:59 PM |

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**Office Hour**

10/4 (Mon) 6:30-8:00 PM

- Any student who has a question regarding the lectures or projects is welcome.
- Attendance to this session is optional.

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**Project 1: DC-AP**

Due: 10/5 (Tue) 11:59 PM
### PROPOSED SCHEDULE 2  
**Live Class Time: Tuesday 6:30 PM – 9:30 PM CST**

<table>
<thead>
<tr>
<th>Module 7</th>
<th>10/12 (Tuesday) 6:30-9:30 PM</th>
<th>Topics</th>
<th>Reading 5,6,7</th>
</tr>
</thead>
</table>
|          |                               | - TextMD, MIX and PREMIS  
|          |                               | - STUDENT PRESENTATION: TextMD/MIX SPECS and Use Cases (Group 3)  
|          |                               | - STUDENT PRESENTATION: PREMIS SPECS and Use Cases (Group 4)  
| Office Hour | 10/18 (Mon) 6:30-8:00 PM | Cyber Office Hour | Run by Sunny Han |
|          |                               | - ANY STUDENT WHO has a QUESTION REGARDING the LECTURES or PROJECTS is WELCOME.  
|          |                               | - ATTENDANCE to this SESSION is OPTIONAL.  
| Module 8 | 10/19 (Tuesday) 6:30-9:30 PM | Topics | Reading 8 |
|          |                               | - METADATA ENCODING and TRANSMISSION SCHEMAS (METS)  
|          |                               | - STUDENT PRESENTATION: METS SPECS and Use Cases (Group 5)  
|          |                               | - METS Usage GUIDELINES and AP Examples  
|          |                               | - DESIGNING and IMPLEMENTING a METS AP  
| Office Hour | 11/1 (Mon) 6:30-8:00 PM | Cyber Office Hour | Run by Sunny Han |
|          |                               | - ANY STUDENT WHO has a QUESTION REGARDING the LECTURES or PROJECTS is WELCOME.  
|          |                               | - ATTENDANCE to this SESSION is OPTIONAL.  
| Module 9 | 10/26 (Tuesday) 6:30-9:30 PM | Topics | Reading 8 |
|          |                               | - METADATA ENCODING and TRANSMISSION SCHEMAS (METS)  
|          |                               | - DESIGNING and IMPLEMENTING a METS AP  
| Office Hour | 11/1 (Mon) 6:30-8:00 PM | Cyber Office Hour | Run by Sunny Han |
|          |                               | - ANY STUDENT WHO has a QUESTION REGARDING the LECTURES or PROJECTS is WELCOME.  
|          |                               | - ATTENDANCE to this SESSION is OPTIONAL.  
| Module 10 | 11/2 (Tuesday) 6:30-9:30 PM | Topics | Reading 9 |
|          |                               | - TOPIC MAPS (ISO Standard Ontology Language)  
|          |                               | - INTRODUCING BASIC CONCEPTS OF TOPIC MAPS  
|          |                               | - MODELING THE FIRST TOPIC MAPS ONTOLOGY TOGETHER  
| Office Hour | 11/1 (Mon) 6:30-8:00 PM | Cyber Office Hour | Run by Sunny Han |
|          |                               | - ANY STUDENT WHO has a QUESTION REGARDING the LECTURES or PROJECTS is WELCOME.  
|          |                               | - ATTENDANCE to this SESSION is OPTIONAL.  
| Module 11 | 11/9 (Tuesday) 6:30-9:30 PM | Topics | Project 3: VRA-AP  
|          |                               | - TM ONTOLOGY MODELING METHODOLOGY 1  
|          |                               | - MODELING and IMPLEMENTING TOPIC MAPS ONTOLOGIES  
| Office Hour | 11/1 (Mon) 6:30-8:00 PM | Cyber Office Hour | Run by Sunny Han |
|          |                               | - ANY STUDENT WHO has a QUESTION REGARDING the LECTURES or PROJECTS is WELCOME.  
|          |                               | - ATTENDANCE to this SESSION is OPTIONAL.  
| Module 12 | 11/16 (Tuesday) 6:30-9:30 PM | Topics | Project 4: METS-AP  
|          |                               | - UNDERSTANDING TM ONTOLOGY MODELING METHODOLOGY 2  
|          |                               | - FURTHER MODELING and IMPLEMENTING TOPIC MAPS ONTOLOGIES  
| Office Hour | 11/15 (Mon) 6:30-8:00 PM | Cyber Office Hour | Run by Sunny Han |
|          |                               | - ANY STUDENT WHO has a QUESTION REGARDING the LECTURES or PROJECTS is WELCOME.  
|          |                               | - ATTENDANCE to this SESSION is OPTIONAL.  

Due: 10/19(Tue) 11:59 PM  
Due: 11/9(Tue) 11:59 PM  
Due: 11/23(Tue) 11:59 PM
## PROPOSED SCHEDULE 3

**Live Class Time: Tuesday 6:30 PM – 9:30 PM CST**

<table>
<thead>
<tr>
<th>Module 13</th>
<th>Topics</th>
<th>Reading 10</th>
</tr>
</thead>
</table>
| 11/23 (Tuesday) 6:30-9:30 PM | - W3C RDF/OWL Ontology Language  
- Introducing Basic Concepts of RDF/OWL Ontology Language | |

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<thead>
<tr>
<th>Module 14</th>
<th>Topics</th>
<th>Project 5: TM Ontology Due: 11/30(Tue) 11:59 PM</th>
</tr>
</thead>
</table>
| 11/30 (Tuesday) 6:30-9:30 PM | - RDF/OWL Ontology Modeling Methodology  
- Modeling and Implementing RDF/OWL Ontologies | |

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<thead>
<tr>
<th>Module 15</th>
<th>Topics</th>
<th>Run by Sunny Han</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/7 (Tuesday) 6:30-9:30 PM</td>
<td>- Further Modeling and Implementing RDF/OWL Ontologies</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Office hour</th>
<th>Cyber Office Hour</th>
<th>Project 5: RDF/OWL Ontology Due: 12/14(Tue) 11:59 PM</th>
</tr>
</thead>
</table>
| 12/13 (Mon) 6:30-8:00 PM | - Any student who has a question regarding the lectures or projects is welcome.  
- Attendance to this session is optional. | |

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Class recordings are reserved only for the use of the students enrolled in this class and only for educational purposes. Recordings should not be shared outside the class in any form. Violation of this restriction could lead to Student Misconduct proceedings.

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Readings

1. **Metadata Basics and XML Schema**
   - Intro to XML Schema: https://www.w3schools.com/xml/schema_intro.asp

2. **DC (Dublin Core)**
   - Dublin Core Terms: http://www.dublincore.org/specifications/dublin-core/dcmi-terms/
   - Dublin Core Terms: http://www.dublincore.org/specifications/dublin-core/dcmi-namespace/

3. **MODS (Metadata Objects and Description Schemas)**

4. **VRA (Visual Resource Association) Core**
   - VRA Core Guide and Maintenance: https://www.loc.gov/standards/vracore/schemas.html
   - VRA Cataloging Examples: http://core.vraweb.org/vracore_examples.html (Pay attention to the XML records.)

5. **PREMIS (Preservation Metadata: Implementation Strategies)**

6. **TextMD (Technical Metadata for Text)**
   - TextMD Guide and Maintenance: https://www.loc.gov/standards/textMD/

7. **MIX (Technical Metadata for Digital Still Images)**
   - MIX Guide and Maintenance: https://www.loc.gov/standards/mix/

8. **METS (Metadata Encoding and Transmission Schemas)**

9. **TM (Topic Maps Ontology Language)**
   - TAO of Topic Maps: https://ontopia.net/topicmaps/materials/tao.html
   - Living with Topic Maps and RDF: https://ontopia.net/topicmaps/materials/tmrdf.html#N121

10. **RDF/OWL (Resource Description Framework and Web Ontology Languages)**
    - RDF Primer: https://www.w3.org/TR/rdf-primer/

11. **Schema.org**
    - Home: https://schema.org/
    - Full hierarchy: https://schema.org/docs/full.html

12. **FOAF**
    - Tool to create your FOAF file: http://www.ldodds.com/foaf/foaf-a-matic.html

13. **Validation and Converting**
    - RDF Validator: https://www.w3.org/RDF/Validator/
    - XML Validator: https://www.w3schools.com/xml/xml_validator.asp
    - RDF Converter: including RDF/XML: http://www.easyrdf.org/converter

Additional Readings (optional)

Recommendation:
- Ontology Summit (each year there is a theme, with multiple sessions/webinars, all free.). https://ontologforum.org/index.php/OntologySummit