

授業科目名(英文名) / Course title	化学海洋学 / Chemical Oceanography				
担当教員(所属) / Instructor	張 勁(理学部生物圏環境科学科)				
授業科目区分 / Category	専門教育科目 グローバルSDGs専門科目				
地域課題解決型人材育成プログラム科目 / COC+Course	-	授業種別 / Type of class	講義科目		
開講学期曜限 / Period	2022年度 / Academic Year 第1ターム / Term 1 木/Thu 2	対象所属 / Eligible Faculty	持続可能社会創成学環(修士課程) グローバルSDGsプログラム / Graduate School of Sustainability Studies Graduate Program in Global Sustainability Science		
時間割コード / Registration Code	D43319	対象学年 / Eligible grade	1年,2年	単位数 / Credits	1単位
ナンバリングコード / Numbering Code					
連絡先(研究室、電話番号、電子メールなど) / Contact					
オフィスアワー(自由質問時間) / Office hours					
Moodleコース統合時間割コード / Moodle course join Registration Code	D43319				
Moodleコース登録教員名 / Moodle course registered Instructor					
MoodleコースURL / Moodle course URL	<a href="https://lms.u-toyama.ac.jp/course/view.php?idnumber=2022_D43319">https://lms.u-toyama.ac.jp/course/view.php?idnumber=2022_D43319</a>				
各種教育プログラム1 / Various Educational programs1					
各種教育プログラム2 / Various Educational programs2					
各種教育プログラム3 / Various Educational programs3					
各種教育プログラム4 / Various Educational programs4					
各種教育プログラム5 / Various Educational programs5					
リアルタイム・アドバイス / Real-time advice	更新日				
授業のねらいとカリキュラム上の位置付け(一般学修目標) / Course Objectives	教育目標 / Educational Goals				
<p>In order to understand the diverse phenomena occurring in the natural environment, it is necessary to have a basic knowledge of the hydrosphere, especially the ocean, and to know the role ocean circulation plays in the Earth's ecosystem. This course aims to help students (1) gain exposure to some of the latest observational research projects, (2) understand the chemical structure of the ocean and its geochemical development in history, and (3) learn about the behavior and circulation of important materials in the ocean environment. Furthermore, from the viewpoint of global warming and other environmental issues, students will be urged to think about the relationships between humans and the marine environment.</p>					
達成目標 / Course Goals					
<p>By the end of the course, students are expected to achieve the following:</p> <ul style="list-style-type: none"> <li>- Understand the basics of hydrosphere chemistry.</li> <li>- Acquire basic knowledge of the ocean and understand the role of ocean circulation in the Earth system.</li> <li>- Deepen their understanding of the distribution of chemical compositions and material circulation in the ocean.</li> <li>- Discuss cogently global warming and other environmental issues as well as human relationships with the ocean environment.</li> </ul>					
授業計画(授業の形式、スケジュール等) / Class schedule					

<p>Session 1: Orientation; General oceanic circulation  Session 2: Nutrient cycle in the ocean  Session 3: Transport and circulation of atmospheric pollutants in the oceans  Session 4: Material circulation in the oceans: Trace elements and Isotopes I  Session 5: Material circulation in the oceans: Trace elements and Isotopes II  Session 6: Global warming: Relationships between humans and the marine environment - Issues raised and Group Discussion I  Session 7: Global warming: Relationships between humans and the marine environment - Group Discussion II  Session 8: Summary and test</p>	
<b>授業時間外学修（事前・事後学修） / Independent Study Outside of Class</b>	
<p>Students are required to study on their own for 0.5~2 hours outside of class for every class session. To fully benefit from a class, they are advised to prepare for it by reviewing the previous classes, and to do the assignments and write reports after the class.</p>	
<b>キーワード / Keywords</b>	Material and oceanic circulation, global environmental issues, interaction between human activities and the ocean environment
<b>履修上の注意 / Notices</b>	The classes will consist of group work and student presentations, as well as the instructor's lectures. A report will be assigned at the end of each section.
<b>教科書 / Required Text</b>	
<b>参考書 / Required Materials</b>	
<b>教科書・参考書に関するその他通信欄</b>	<p>No textbook specified; lecture materials will be provided in the lesson.</p> <p>The following reference book will be used (other study guides will be introduced as needed).  " Invitation to Oceanography ", Paul R. Pinet, Jones and Bartlett Publishers Inc.</p>
<b>成績評価の方法 / Evaluation</b>	<p>Students are expected to attend all classes.</p> <p>Evaluation will be done in a comprehensive manner based on reports as well as student participation and attitude.</p>
<b>関連科目 / Related course</b>	Sustainability Environmental Science, Climate Change Analysis
<b>リンク先URL / URL of syllabus or other information</b>	<a href="https://evaweb.u-toyama.ac.jp/html/556_ja.html">https://evaweb.u-toyama.ac.jp/html/556_ja.html</a> ( <a href="https://researchmap.jp/read0083133">https://researchmap.jp/read0083133</a> )
<b>備考 / Notes</b>	

授業追加情報 / Course add information

使用言語 / Language	Japanese and English
アクティブ・ラーニングの実施 / Active learning	実施あり
アクティブラーニングの実施内容 / Contents of Active learning	We will foster scientific and logical thinking and information editing skills through active discussions in an interactive manner.
実務経験教員科目 / Work Experience teacher's subjects	
データサイエンス科目 / Data Science subjects	
他学部・他研究科等学生の履修可否 /	Not available