*2021 Seoul National University Online ISP – Course Syllabus: Computational Modeling for Fluid Dynamics (Graduate Level)*

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| 교과목 번호 (Course Code) | 명칭 (Title) | 국문 | **유체역학의 계산과학 모델링** | | | |
| M3229.000800 | | 영문 | **Computational Modeling for Fluid Dynamics** | | | |
| 학과(부)(전공) (Department) | 공과대학 항공우주공학과 (Dept. of Aerospace Engineering, College of Engineering) | | 과정 및 학년 (Level) | 대학원 (Graduate) | 학점구조 (Credit-Structure) | 3-3-0 |
| 교과구분 (Classification) | 전공선택 (Elective Subject for Major) | | 성적부여 (Grading) | A-F | 수강정원 (Quota) | 30 |
| 담당교원 (Instructor) | **TORO, Eleuterio F.** / eleuterio.toro@unitn.it , https://eleuteriotoro.com / 0039 0461282672<br>Office Hour: Anytime online (via eTL) | | | | | |
| 수업기간 (Course Dates) | 22 June – 22 July, 2021 | | 강의시간 (Timetable) | Tue, Wed, Thu (15:00~18:00) | | |
| 운영방식 (Mode of Teaching) | 실시간 온라인 강의<br>(Synchronous = Real-time Online Lectures) | | | | | |

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| Prerequisite Course | N/A | | | | | | | |
| Course Objectives | This course is introductory, with strong emphasis on a clear understanding of underlying concepts and principles involved in the numerical approximation of hyperbolic partial differential equations. | | | | | | | |
| Course Materials and References | Eleuterio F. Toro. *Riemann solvers and numerical methods for fluid dynamics. A practical introduction. Third edition.* Springer-Verlag, Berlin Heidelberg, 2009. | | | | | | | |
| Evaluation (%) | Attendance | Assignment | Midterm | Final | Additional Evaluation | Attitude | Other | Sum |
| | 20 | 30 | | 50 | | | | 100 |
| | Attendance Policy : | Students who are absent for over 1/3 of the class will receive a grade of 'F' or U' for the course. (Exceptions can be made when the cause of absence is deemed unavoidable by the course instructor.) | | | | | | |
| | Other Remarks : | N/A | | | | | | |
| Lecture Plan | DAY 1: The linear advection equation. Basics on numerical methods.<br>DAY 2: Theoretical concepts on numerical methods.<br>DAY 3: Nonlinear numerical methods.<br>DAY 4: Linear hyperbolic equations. Nonlinear scalar equations.<br>DAY 5: Nonlinear hyperbolic systems.<br>DAY 6: The Euler equations. The exact Riemann problem.<br>DAY 7: Approximate Riemann solvers and numerical fluxes for the Euler equations<br>DAY 8: FORCE, HLL, HLLC, Roe; Dumbser-Osher-Toro.<br>DAY 9: The TV flux splitting scheme.<br>DAY 10: High-order non-linear methods, overview.<br>DAY 11: Fully discrete and semi-discrete approaches.<br>DAY 12: The ADER method. Convergence rates.<br>DAY 13: Spatial reconstruction methods: ENO, WENO, AENO.<br>DAY 14: Methods for multidimensional equations.<br>DAY 15: Relaxation approximation. | | | | | | | |

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| Additional Notes for Students | | N/A |
| Assistance for Students with Disabilities | Class | ○ Visual Impairment: Make textbooks(digital textbook, braille textbook, enlarged textbook etc.), Allow note takers<br>○ Physical Disability: Make textbooks (digital textbook), Allow note takers and assistants<br>○ Hearing Impairment: Allow note takers and translators, Allow lecture recording<br>○ Health Impairment: Excuse absence due to health problems, Allow note takers<br>○ Learning Disability: Allow note takers<br>○ Intellectual Disability / Autism Spectrum Disorder: Allow note takers and mentors |
| | Assignment & Evaluation | ○ Visual Impairment / Physical Disability / Hearing Impairment / Health Impairment / Learning Disability: Extend assignment deadlines, Offer alternate assignment submission and response method, Extend testing period, Offer alternate testing method, Offer different testing room<br>○ Intellectual Disability / Autism Spectrum Disorder: Offer individualized assignments and alternative evaluations |
| | Others | Students who take this course can get appropriate level of support service including the support listed above depending on the students' individual characteristics and needs through consultation with professors and the Support Center for Students with Disabilities. If you have any questions concerning support service for students with disabilities you can contact Professor ***(Contact Information) or Support Center for Students with Disabilities (02-880-8787). |