**Assignment Brief**

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| **DEPARTMENT OF MECHANICAL & AEROSPACE ENGINEERING** |  |
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| Pro-forma to accompany assignment / coursework 2021/2022 |

This pro-forma should be the first page to any set assignment / coursework. A full assignment brief should accompany this pro-forma.

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| **Module Code:**  ME3621 | **Module Leader:** | Dr J. Tyacke | **Assessor:** | Dr J. Xia  Dr J. Tyacke |
| **Module Title:** ME3621 **-** Applied Fluid Mechanics | | | | |
| **Assessment Title:**  Turbulent Heat Transfer in Smooth and Corrugated Cooling Channels | | | | **Weighting: 30%** |

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| **Main objectives of the assessment:**  To achieve an awareness of the practical and theoretical principles underlying numerical modelling and CFD codes by completing a simulation and analysis exercise using ICEM CFD and ANSYS (FLUENT). | |
| **Brief Description of the assessment:**  Computer simulation of fluid flow and heat transfer. Details provided below. | |
| **Learning outcomes for the assessment:**   * Principles and applications of Computational Fluid Dynamics. * Analysis of the results of numerical simulations and validation. * Employment, interpretation and appraisal of problem solutions from evaluation and simplification of the actual problem to definition of the model and validation of the results. * Technical report writing; time management and effective use of resources; hands-on experience with the use of engineering software. * Technical presentation skills. | **Assessment method:**  Students will be required to:   1. Attend CFD labs to learn how to produce a grid that is suitable for the problem using ICEM and how to conduct simulations in Fluent. 2. Submit a report, which meets the objectives, format and deadline as specified in this pro-forma, the attached sheet and the template.   Important Notes:Your work will be scrutinised only on the University terminals in the computing labs.  Therefore, no other forms of presentation such as Power Point or Fluent on a laptop will be acceptable.  After the submission of the report, until the assessment is completed, you may be asked to demonstrate your familiarity with using the CFD code on the University terminals and display the results, including those in the final report. It is therefore necessary that all the files are kept in a safe directory until the assessment is completed and feedback is given. Students are asked to submit an electronic copy of the work. |
| **Assessment method by which a student can demonstrate learning outcomes:**  Presentation  Clarity of presentation, including figures and tables.  Clarity of writing.  Choice of structure for the report.  Use of references and citing of references within the report.  Figure numbering, figure captions, table numbering and table heading, use of units, and referencing of cited papers is expected.  Problem setup  Description of the problem, including the modelling techniques chosen.  Description and justification of the boundary conditions.  Choice of mesh, convergence and modelling methodology.  Critical analysis and interpretation of results  Analysis of results, engineering context of results, comparison with literature.  Physical interpretation and explanation of results, choice of physical parameters to plot, critical appraisal of method used and results obtained. | |
| **Format for the assessment/coursework (Guidelines on the expected format and length of submission):**  A maximum of 10 pages is allowed for the complete report following the structure specified in the template provided. Use Arial font 11 for the text body and 1.5 line spacing. Note References should be included in the 10 pages.  A report with a different font, font size, line spacing or more than 10 pages (INCLUDING references) will be penalised. Only a 2-page appendix is allowed, comprising the first 2 pages of the Fluent summary report. Any further attachments will be disregarded.  Usual good report writing skills such as figure numbering, figure captions, table numbering and table heading, use of units, referencing to the figures, plus referencing of cited papers are expected. | |

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| **Distribution date to students:** 01/10/2021 | **Online Submission Deadline: 09/11/2021** |
| **Indicative Reading List:**   * Massey/Smith - Mechanics of fluids - <https://go.exlibris.link/92YGgv7y> * Yasuki - Introduction to fluid mechanics - <https://go.exlibris.link/McRjpBwR> * Schlichting - Boundary-layer theory - <https://go.exlibris.link/H8mdm3Sg> * Tu - Computational fluid dynamics: a practical approach - <https://go.exlibris.link/XBH8SddT> * Rodriguez - Applied Computational Fluid Dynamics and Turbulence Modeling - <https://go.exlibris.link/wQBBC1Dt> * Ferziger and Peric - Computational methods for fluid dynamics - <https://go.exlibris.link/TJkdGgjZ> * Blazek - Computational fluid dynamics: principles and applications - <https://go.exlibris.link/z4Rwx9Kt> | |
| **Further information:**   * Videos on Blackboard and Teams. | |