**TEMPLATE FOR COURSE SPECIFICATION**

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| Aerodynamics |

**COURSE SPECIFICATION**

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| Teaching the course through 3 hrs per week, 2 theories and 1 tutorial. Number of Quizzes (10-15) is made to test the teaching effectiveness and student’s ability. |

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| University of Baghdad | ***1. Teaching Institution*** |
| Mechanical Engineering-Aeronautics | ***2. University Department/Centre*** |
| Aerodynamics – ME406 | ***3. Course title/code& Description*** |
| 4th-class of Aeronautical Engineering | ***4. Programme(s) to which it Contributes*** |
| Class and Lab. | ***5. Modes of Attendance offered*** |
| Year | ***6. Semester/Year*** |
| 3 hours | ***7. Number of hours tuition (total)*** |
| 3-4-2017 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| The primary goal of this course is to provide an understanding of, and ability to solve and analyze, problems pertaining to the aerodynamics of aircraft. This course introduces the student to the "differential" (as opposed to "integral") analysis of inviscid and viscous fluid motion. The students are expected to attain a detailed understanding of flow kinematics (e.g., streamlines, pathlines, vorticity, rate-of-strain, …) and dynamics (the Navier-Stokes and continuity equations, Euler's equations, potential flow theory) and to use these principles for engineering analysis of external fluid flows.. | |

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| ***10·Learning Outcomes***  As an outcome of completing this course, students will:   1. Be able to understanding the principle concepts of aerodynamics and finding the forces and moments for the flying bodies. 2. Understanding the governing equations of the compressible and incompressible flows and formulates them to solve engineering problems in aerodynamics. 3. Be able to understand the inviscid, incompressible flow for first approximation of the aerodynamic analysis. 4. Understanding the airfoil shapes series and how representing them with thin airfoil theory. 5. Understanding the lifting line theory and formulate this theory to a finite wings. 6. Understanding boundary layer development over flying bodies with different regions laminar, transition and turbulent. 7. Understanding the computational fluid dynamics with emphasis on the Panel method. |
| ***11.Teaching and Learning Methods*** |
| Lecture recap and in-class activities: each class will commence with a recap of the previous lecture, questions will be asked and the responses will be used to evaluate the students’ understanding of the topics covered. In addition, homework will be given and the answers of the preceding exams will be reviewed and discussed. |
| ***13. Grading Policy***   1. Homework:    * There will be a minimum of seven sets of homework during the academic year.    * The homework will count 5% of the total course grade. 2. Quizzes:    * There will be a minimum of ten closed books and notes quizzes during the academic year.    * The quizzes will count 25% of the total course grade. 3. Final Year Exam:    * The final exam will be comprehensive, closed books and notes.    * The final exam will count 70% of the total course grade. |

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| ***14. Course Structure*** | | | | | |
|  | hours |  |  |  | Week |
|  | 3 |  |  | **Introductory Concepts To Aerodynamics** | 1 |
|  | 3 |  |  | **Aerodynamic Forces and Moments** | 2 |
|  | 3 |  |  | **Aerodynamic Forces and Moments** | 3 |
|  | 3 |  |  | **Fundamental Principle and Equations** | 4 |
|  | 3 |  |  | **Fundamental Principle and Equations** | 5 |
|  | 3 |  |  | **Fundamental Principle and Equations** | 6 |
|  | 3 |  |  | **Fundamental Principle and Equations** | 7 |
|  | 3 |  |  | **Inviscid, Incompressible Flow** | 8 |
|  | 3 |  |  | **Inviscid, Incompressible Flow** | 9 |
|  | 3 |  |  | **Inviscid, Incompressible Flow** | 10 |
|  | 3 |  |  | **Inviscid, Incompressible Flow** | 11 |
|  | 3 |  |  | **Inviscid, Incompressible Flow** | 12 |
|  | 3 |  |  | **Incompressible Flow over Airfoil** | 13 |
|  | 3 |  |  | **Incompressible Flow over Airfoil** | 14 |
|  | 3 |  |  | **Incompressible Flow over Airfoil** | 15 |
|  | 3 |  |  | **Incompressible Flow over Airfoil** | 16 |
|  | 3 |  |  | **Incompressible Flow over Airfoil** | 17 |
|  | 3 |  |  | **Incompressible Flow over Finite Wing** | 18 |
|  | 3 |  |  | **Incompressible Flow over Finite Wing** | 19 |
|  | 3 |  |  | **Incompressible Flow over Finite Wing** | 20 |
|  | 3 |  |  | **Incompressible Flow over Finite Wing** | 21 |
|  | 3 |  |  | **Boundary Layer Theory** | 22 |
|  | 3 |  |  | **Boundary Layer Theory** | 23 |
|  | 3 |  |  | **Boundary Layer Theory** | 24 |
|  | 3 |  |  | **Boundary Layer Theory** | 25 |
|  | 3 |  |  | **Boundary Layer Theory** | 26 |
|  | 3 |  |  | **Computational Fluid Dynamics** | 27 |
|  | 3 |  |  | **Computational Fluid Dynamics** | 28 |
|  | 3 |  |  | **Computational Fluid Dynamics** | 29 |
|  | 3 |  |  | **Computational Fluid Dynamics** | 30 |

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| ***15. Infrastructure*** | | |
|  | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
|  | Special requirements (include forexample workshops, periodicals,IT software, websites) | |
|  | Community-based facilities  (include for example, guest  Lectures , internship,field studies) | |
| ***16. Admissions*** | | |
|  | | Pre-requisites |
|  | | Minimum number of students |
|  | | Maximum number of students |
|  | | ***17. Course Instructors*** |

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