Second year Engineering

ILOs: Apply the mathematical formulation of the basic laws governing laminar fluid flow kinematics and dynamics and be able to discuss the assumptions that underlie them (criteria 1, 3); Apply dimensional analysis to given engineering situations, and apply dynamic similarity laws to scale models and full size components (criterion 1); Describe fluid flow around engineering shapes, including the phenomena of boundary layers and wakes, and calculate their lift and drag characteristics (criteria 2, 3)

CLOs: Numerous CLOs refer to teamwork and communication skills (criterion 4)

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| Criteria | HD | DN | CR | PP | NN |
| Demonstrate and apply theoretical and practical knowledge of Fluid Mechanics and related engineering principles to design a marine vehicle  (30%) | Demonstrate and apply *comprehensive* knowledge of maritime fluid mechanics and hydrostatics when *thoroughly discussing and describing* the *main* concepts and features related to the design.  Make *meaningful assumptions* and *correctly calculate all* of the expected parameters and variables, *thoroughly justifying* their use and outcomes.  S*upport all* your work with *extensive, relevant and current* literature, *link all* of your design and development work to *relevant* fluid mechanics theory and maritime industry practices. | Demonstrate and apply *broad* knowledge of maritime fluid mechanics and hydrostatics when *discussing and describing* the *main* concepts and features related to the design.  Make *relevant assumptions* and *correctly calculate* the expected parameters and variables, *justifying* their use and outcomes.  *Support* your work with *relevant* and *current* literature, *link most* of your design and development work to *relevant* fluid mechanics theory and maritime industry practices | Demonstrate and apply knowledge of maritime fluid mechanics and hydrostatics when *discussing and describing* *most* of the concepts and features related to the design.  Make *assumptions* and *calculate most* expected parameters and variables, *justifying* their use and outcomes.  *Support most of* your work with *relevant* literature, *link some of* your design and development work to *relevant* fluid mechanics theory and maritime industry practices. | Demonstrate and apply *basic* knowledge of maritime fluid mechanics and hydrostatics when *discussing and describing* *some* of the concepts and features related to the design.  Make at least *half the* *required assumptions* and *calculate some* of theexpected parameters and variables, partially *justifying* their use and outcomes.  *Support* at least *half* of your work with literature, *link some* ofyour design and development work tofluid mechanics theory and maritime industry practices. | Demonstrate *partially-developed* knowledge of fluid mechanics and hydrostatic, and *state* concepts and *describe* features related to the design.  Make *insufficient or wrong* assumptions and *partially* calculate *some* of the expected parameters, o*ccasionally* *justifying* their use and outcomes.  *Partially link* to *some* fluid mechanics and engineering practices. |
| Solve problems in the construction and testing phases of the marine vehicle (30%) | Communicate and work *effectively* in a team and as a leader to *efficiently* plan and conduct the project to achieve *all* stipulated goals.  Solve problems in the construction & testing phases to:   * provide *accurate*, *innovative and practica*l solutions, * devise a *detailed* and *correct* testing schedule and conduct *correct, complete, and safe* testing of the vehicle, and * *successfully* develop a *working* marine vehicle that *meets all* and *exceeds some* operational specifications. | Communicate and work *effectively* in a team and as a leader to plan and conduct the project to achieve *all* stipulated goals.  Solve problems in the construction & testing phases to:   * provide accurate and practical solutions most of which are innovative, * devise a correct testing schedule and conduct correct, mostly complete, and safe testing of the vehicle, and * successfully develop a working marine vehicle that meets all operational specifications. | Communicate and work in a team and *occasionally* as a leader to plan and conduct the project to achieve *most* of the stipulated goals.  Solve problems in the construction & testing phases to:   * provide accurate and practical solutions, * devise a testing schedule and conduct correct and safe testing of the vehicle, and * successfully develop a working marine vehicle that meets most of the operational specifications. | Communicate and work *regularly* in a team to plan and conduct the project to achieve the *some* stipulated goals.  Solve problems in the construction & testing phases to:   * provide some accurate and practical solutions, * devise a testing schedule and conduct safe testing of the vehicle and at least half of this is correct, and * develop a partially working marine vehicle that meets at least half of the operational specifications. | Work *mainly* as an *individual.*  *Partially solve problems* in the construction & testing phases to:   * provide inaccurate and/or incomplete solutions, * conduct incorrect, unsafe and incomplete testing, and * develop a vehicle that meets a few of the operational specifications. |
| Analyse results to justify assessment of marine vehicle’s performance (20%) | Thoroughly and methodically analyse data/results by:   * comparing all of the predicted and actual performance of the vehicle to accurately assess how well it meets the operational specifications * clearly justifying your judgments by referring to relevant and current literature, theory and calculations. | Methodically analyse data/results by:   * comparing most of the predicted and actual performance of the vehicle to accurately assess how well it meets the operational specifications * justifying your judgments by referring to relevant and current literature, theory and calculations. | Analyse data/results by:   * comparing most of the predicted and actual performance of the vehicle to accurately assess, for the most part, how well it meets the operational specifications * justifying most of your judgments by referring to partly relevant literature, theory and calculations. | Analyse data/results by:   * comparing at least half of the predicted and actual performance of the vehicle to assess how well it meets the operational specifications * justifying at least half your judgments by referring to some literature, theory and calculations. | Analyse some data/results. |
| Communicate in a team in writing in the form of a technical report  (20%) | Communicate *concisely* and *coherently* in a *structured* and *readable* report that adheres to the *given format.*  Include *comprehensive*, *fully* *detailed, and correct sketches* and *CAD* *drawings* that *make it easy* to comprehend the construction and layout of the vehicle.  Present data in a format that is *easily* *interpreted* because it:   * is *neat*, *clearly, and accurately sorted and labelled* * *uses clear, concise and accurate legend*s and *units* | Communicate *concisely* and *coherently* in a *structured* and *readable* report that adheres to the *given format.*  Include *detailed* *and correct sketches* and *CAD* *drawings* that *make it easy* to comprehend the construction and layout of the vehicle.  Present data in a format that is *easily* *interpreted* because it:   * is neat, clearly and accurately sorted and labelled * uses clear, concise and accurate legends and units | Communicate *coherently* in a *structured* and *readable* report that adheres to the given format.  Include *correct sketches and CAD drawings* that *assist* in comprehending the construction and layout of the vehicle.  Present data in a format that can be *interpreted* because it:   * is *clearly and accurately sorted and labelled* * *uses clear and accurate legend*s and *units* | Communicate in a *structured and readable* report that *largely* adheres to the given format.  Include *sketches* and *CAD drawings* that *assist* in comprehending *most* of the construction and layout of the vehicle.  Present data in a format that can be *interpreted* because it:   * is sorted and labelled * uses accurate legends and units | Present information. |