

OR 2023/4 projects: Dissertation Grade Descriptors

Marking is guided using the following criteria:

Understanding and Depth of Academic Content

Weight: 1

B	<i>The report shows good understanding of the principal objectives of the project. The student was able to master the underlying theoretical techniques and mathematical models, correctly apply straightforward numerical algorithms, or perform an adequate statistical data analysis, as appropriate to the nature of the project. However, some errors occur where the student has missed or misunderstood some aspect of the underlying theory, models or algorithms, or has made an error in the application of an algorithm or the statistical data analysis.</i>		
Better		Worse	
A3	<i>The student achieved the principal objectives of the project and described advanced aspects of the given topic in the process. The student mastered advanced theoretical concepts or mathematical models, correctly applied elaborate numerical algorithms, or performed a sound statistical data analysis. Errors are few and mostly minor.</i>	C	<i>The report presents evidence of understanding of the principal objectives of the project, and of the underlying techniques, but there are gaps. Theoretical discussions, numerical algorithms, or statistical techniques are generally complete and used correctly, but there are errors or gaps. There may be a small number of more significant errors.</i>
A2	<i>The student demonstrated a deep scientific understanding of the given topic that evidences full understanding of the material. The student mastered complex theoretical concepts or mathematical models, correctly applied highly involved numerical algorithms, or performed a rigorous statistical data analysis, making only a few minor mistakes.</i>	D	<i>The report presents limited evidence of some understanding of the principal objectives of the project, and of the underlying techniques. However, theoretical discussions are incomplete or erroneous in several places, mathematical models, numerical algorithms or statistical techniques have either been misunderstood, applied wrongly or were not appropriate for the problem.</i>
A1	<i>The report shows exceptional analytical and problem-solving skills. The student demonstrated the ability to engage with a complex topic in a rigorous scientific fashion. Sections of the work are of near-publishable quality.</i>	E-H	<i>The report evidences little understanding of the principal objectives of the project and of the underlying techniques. Theoretical discussions are incomplete or erroneous in many places. Mathematical models, numerical algorithms, or statistical techniques have been grossly misunderstood and wrongly applied, or were not adequate for the problem.</i>

Originality of Approach

Weight: 1

B	<i>The student followed the most obvious research direction or solution approach, showing little initiative to explore different directions or present alternative approaches. The report is mostly derived from the background material, containing only a few minor original theoretical contributions. The mathematical models, numerical algorithms, or statistical techniques used in the project are standard and straightforward, with only a few minor modifications.</i>		
Better		Worse	
A3	<i>The student came up with a few ideas to explore different research directions or alternative solution approaches. The student achieved some improvement over the background material by deriving new theoretical results or methodological constructions, extending or modifying existing models or algorithms, or applying new statistical techniques that are close to techniques covered in the syllabus. However, most original contributions are minor.</i>	C	<i>The student presented only minor variations of the most obvious research direction or solution approach. The report is mostly a collection of background material. No original theoretical results are provided and the mathematical models, numerical algorithms, or statistical techniques are straightforward and used without any modification.</i>
A2	<i>The student was very creative, coming up with several ideas for different research directions or alternative solution approaches. The student made a significant contribution to the given topic, deriving several original</i>	D	<i>The student stuck to the most obvious research direction or solution approach and the report replicates existing results which can be found in the literature without much reflection. The used mathematical models, numerical</i>

	<i>theoretical contributions, or extensions or modifications of existing models or algorithms, or applying new statistical techniques that are outside the syllabus.</i>		<i>algorithms, or statistical techniques are very simple and known from the syllabus.</i>
A1	<i>The report shows an exceptional degree of originality, both in the results obtained and the route taken. The student obtained a considerable number of original theoretical results or methodological constructions, derived new models and algorithms, or applied new statistical techniques from the recent literature. The student came up with unforeseen research directions or solution approaches.</i>	E-H	<i>The reports lacks any evidence of originality, both in the results obtained and the route taken. The student presented existing results from a narrow section of the background material that are possibly restricted to those suggested to them and only the research direction or solution approach set out in the project description was followed.</i>

Amount of Work Done

Weight: 1

B	<i>The amount of work done represents a solid attempt to address the topic of the project. The report gives a solid explanation of background material. Work done is evidenced through a number of theoretical contributions, the implementation of models and algorithms, or a statistical or numerical analysis.</i>		
Better		Worse	
A3	<i>All questions raised in the project description are addressed. The report gives a detailed explanation of the background material needed to understand the topic. Work done is evidenced through several theoretical contributions, the implementation of extensive models and algorithms, or a substantial statistical or numerical analysis.</i>	C	<i>The student addressed most of the questions raised in the project description to an adequate level of detail. The report gives a satisfactory explanation of the background material needed to understand the given topic. Depending on the nature of the project, the report includes theoretical results, for example, worked examples or details of existing proofs, the implementation of mathematical models and numerical algorithms, or a statistical or numerical analysis, although there may be cases where these are incomplete.</i>
A2	<i>The report goes beyond the questions raised in the project description. A complete explanation is given of the background material needed to understand the topic. Work done is evidenced through numerous theoretical contributions, the implementation of complex models and algorithms, or significant statistical or numerical analysis.</i>	D	<i>The report contains an explanation of the background material needed to understand the topic of the project, but the presentation of the main part of the project is incomplete. Work done is evidenced through a few theoretical contributions, the implementation of simplistic models and algorithms, or a preliminary statistical or numerical analysis.</i>
A1	<i>The report goes well beyond the questions raised in the project description. A complete explanation is given of the background material needed to understand the topic. Work done is evidenced through substantial theoretical contributions, the implementation of very large and complex models and algorithms, or an all-embracing statistical or numerical analysis.</i>	E-H	<i>Only few of the questions raised in the project description are addressed in the report. An explanation is given of some of the background material needed to understand the topic; however, many essential parts are missing. Work done is evidenced through very few and minor theoretical contributions, the implementation of trivial models and algorithms, or a coarse statistical or numerical analysis.</i>

Logic of Argument

Weight: 1

B	<i>The report presents most of the main steps in the mathematical, statistical, or computational reasoning that underlies the project, although there may be minor logical gaps, or details missing, perhaps including a serious gap.</i>		
Better		Worse	
A3	<i>The report presents the main steps in the mathematical, statistical, or computational reasoning that underlies the project, although there may be a small number of minor logical gaps, or details missing.</i>	C	<i>The report presents some of the main steps in the mathematical, statistical, or computational reasoning that underlies the project, although there may be logical gaps, or details missing, perhaps including a number of more serious gaps.</i>

A2	<i>The report presents the main steps in the mathematical, statistical, or computational reasoning that underlies the project, with few logical gaps or details missing.</i>	D	<i>The report describes a few of the main steps of the mathematical, statistical, or computational argument that underlies the project, but there are serious gaps.</i>
A1	<i>The report presents a comprehensive discussion of the steps in the mathematical, statistical, or computational reasoning that underlies the project.</i>	E-H	<i>The report contains a significant number of gaps and serious errors.</i>

Background and References

Weight: 1

B	<i>The report cites relevant sources, which include some background items and precursor results for the research presented in the report. There are instances where a citation is lacking, the relevance of cited work is unclear, or the embedding into the field of research is missing. A small number of references may be wrongly formatted or missing vital information.</i>		
Better		Worse	
A3	<i>All sections of the report are adequately supported by references to relevant background and precursor items. References are chosen mostly from appropriate sources. The bibliography contains minor mistakes.</i>	C	<i>The report makes some limited use of relevant sources, which include some background items and precursor results for the research presented in the report. There are a number of instances where a citation is lacking, the relevance of cited work is unclear, or the embedding into the field of research is missing. A number of references may be wrongly formatted or missing vital information. There may be a number of inappropriate sources.</i>
A2	<i>Great care and consistency is shown in selecting the most appropriate references for embedding the project in the field of research, and for supporting scientific claims made in the report. References are chosen exclusively from appropriate sources.</i>	D	<i>Only few key references are cited appropriately, with many essential citations missing or not being clearly relevant to the argument. A number of items in the bibliography are incomplete, incorrect, or inconsistently formatted. There are numerous inappropriate sources.</i>
A1	<i>The referencing shows that the students comprehensive reading of the literature has considerably benefited the quality of results obtained, or the strength of conclusions drawn. The bibliography is presented professionally.</i>	E-H	<i>Key references are missing almost completely. The bibliography may be highly erroneous. The bibliography consists predominantly of inappropriate sources.</i>

Validity and Assessment of Results

Weight: 1

B	<i>There is satisfactory evidence that the findings presented in the report are derived from the background material and the existing data, and that they are correct overall. However, minor inconsistencies and mistakes do appear. There is some discussion of the validity and plausibility of the results. The choice of models and algorithms for the analysis is adequate. Where data is used, it is by and large verified and visualised properly.</i>		
Better		Worse	
A3	<i>The presentation of the findings of the project, and the discussion of the validity of results is convincing and reliable. Conclusions are well founded and demonstrate awareness of the broader scientific aims of the project. However, minor inconsistencies may occur.</i>	C	<i>There is some evidence that the finding presented in the report are derived from the background material, and that they correct overall. However there are inconsistencies and mistakes, and cases where expected evidence may be missing. Conclusions drawn are generally well founded and reasonable, but there may be gaps in the argument.</i>
A2	<i>The findings of the project are discussed in detail and validated in a manner that is fully supported by the results presented in the report. The embedding into the scientific context of the project is near-flawless. The choice of models and algorithms is appropriate. Where data is used, it is carefully verified and informatively visualised.</i>	D	<i>There is almost no discussion or validation of the results, which may be highly erroneous. The scarce findings presented in the report connect only weakly to the objectives of the project, and to a broader scientific enquiry. The choice of models and algorithms is poor. Where data is used, it is verified only haphazardly and visualised confusingly.</i>
	<i>The discussion of the findings of the project and the</i>		<i>The results are highly erroneous or otherwise deficient in a</i>

A1	<i>validation of results is exemplary and provides deep mathematical, statistical or computational insight. A number of important questions for future research in the field are identified. The choice of models and algorithms is a perfect fit for the problem at hand. Where data is used, it is thoroughly verified and very informatively visualised.</i>	E-H	<i>manner that should have been easily avoidable given the approach taken in the project. Any discussion and validation is extremely sparse, or almost entirely wrong. The choice of models and algorithms is very poor. Where data is used, no effort is made to verify and visualise it.</i>
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Presentation

Weight: 2

B	<i>The report is laid out competently. Figures and tables are presented legibly, and captions are informative, although there may be cases where the presentation of figures is unclear. Formulae are in most cases unambiguous, and notation is generally well-defined where needed, but with some exceptions. The report is generally written in an appropriate style, perhaps with some minor exceptions. Cross-references are generally used appropriately, perhaps with some gaps.</i>		
Better		Worse	
A3	<i>The report is generally well laid out. Figures and tables are presented clearly, and captions are informative, although there may be a small number of minor cases where the presentation of figures is unclear. Formulae are in almost all cases unambiguous, and notation is generally well-defined where needed. The report is generally written in an appropriate style, perhaps with a small number of exceptions. Cross-references are generally used appropriately, perhaps with some minor gaps.</i>	C	<i>The report makes use of appropriate presentation, but there may be a number of exceptions. Some figures and tables are presented legibly with brief captions, but there may also be cases of figures which are unclear otherwise not well laid out. There are some correctly formatted formulae, but there are also cases of unclear or incorrect formula. There may be cases where required notation is not defined. The report may not be written in an appropriate style. There is some use of cross-referencing, but there may be a number of missing cross-references or errors.</i>
A2	<i>The report is well laid out. Figures, tables, and mathematical formulae are presented clearly and appropriately, with very few lapses. The report is clearly written, and uses an appropriate style. Cross-references are used correctly and appropriately.</i>	D	<i>A small number of elements are appropriately presented, but there are a number of serious gaps or deficiencies in presentation or style.</i>
A1	<i>The report exhibits exemplary presentation. All expected elements are included and presented with proficiency, and in a manner which communicate and support the key elements of the report.</i>	E-H	<i>There are substantial deficiencies in presentation and style.</i>