

Subject Description Form

Subject Code	AMA482
Subject Title	Scheduling
Credit Value	3
Level	4
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	Enable students to understand the ideas, methods and techniques in scheduling problems and apply them to optimally allocating resources in manufacturing, production and service industries.
Intended Learning Outcomes	<p>Upon satisfactory completion of the subject, students should be able to:</p> <ol style="list-style-type: none"> 1. identify different structures of various kinds of scheduling problems; 2. apply the knowledge of scheduling to design, formulate and solve real-world scheduling problems; 3. apply the mathematical knowledge and techniques to verify and validate scheduling rules for scheduling problems; 4. analyze and interpret results when applying scheduling rules for real scheduling problems; 5. present analysis results of scheduling problems.
Subject Synopsis/ Indicative Syllabus	<p><i>Overview of scheduling problems and applications</i> Objective function, regular cost functions, just-in-time principle, earliness/tardiness penalties, deterministic and/or stochastic models.</p> <p><i>Single-machine and parallel-machine scheduling</i> Sequencing jobs on a single machine; mean weighted flow time, total weighted number of tardy jobs, linear and quadratic functions of earliness/tardiness; SPT rule, EDD rule and V-shape of an optimal sequence; dynamic programming algorithms.</p> <p><i>Stochastic scheduling models</i> Random processing times and due dates; normal, exponential and other probability distributions for processing times; minimizing expected cost functions; random machine breakdowns and Poisson process; specific and general stochastic objective functions.</p> <p><i>Computational complexity</i> NP-hardness and polynomial time.</p> <p><i>Applications</i> Manufacturing systems and other industrial and business operations.</p> <p><i>Typical Mini-project</i> Scheduling production process in manufacturing systems; company staff scheduling; transport systems scheduling.</p>

Teaching/Learning Methodology	(1) will be achieved via lectures. (2), (3) and (4) will be achieved via lectures, tutorials and project/case study. (5) will be achieved via project/case study.																																																		
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1" data-bbox="427 338 1455 813"> <thead> <tr> <th data-bbox="434 347 721 510" rowspan="2">Specific assessment methods</th> <th data-bbox="727 347 874 510" rowspan="2">% weighting</th> <th colspan="5" data-bbox="880 347 1449 439">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th data-bbox="880 439 992 510">1</th> <th data-bbox="999 439 1110 510">2</th> <th data-bbox="1117 439 1228 510">3</th> <th data-bbox="1235 439 1347 510">4</th> <th data-bbox="1353 439 1449 510">5</th> </tr> </thead> <tbody> <tr> <td data-bbox="434 510 721 607">a. Computer Assignments</td> <td data-bbox="727 510 874 607">20%</td> <td data-bbox="880 510 992 607">✓</td> <td data-bbox="999 510 1110 607">✓</td> <td data-bbox="1117 510 1228 607">✓</td> <td data-bbox="1235 510 1347 607">✓</td> <td data-bbox="1353 510 1449 607">✓</td> </tr> <tr> <td data-bbox="434 607 721 674">b. Tests</td> <td data-bbox="727 607 874 674">20%</td> <td data-bbox="880 607 992 674">✓</td> <td data-bbox="999 607 1110 674">✓</td> <td data-bbox="1117 607 1228 674">✓</td> <td data-bbox="1235 607 1347 674">✓</td> <td data-bbox="1353 607 1449 674"></td> </tr> <tr> <td data-bbox="434 674 721 741">c. Examination</td> <td data-bbox="727 674 874 741">60%</td> <td data-bbox="880 674 992 741">✓</td> <td data-bbox="999 674 1110 741">✓</td> <td data-bbox="1117 674 1228 741">✓</td> <td data-bbox="1235 674 1347 741">✓</td> <td data-bbox="1353 674 1449 741"></td> </tr> <tr> <td data-bbox="434 741 721 813">Total</td> <td data-bbox="727 741 874 813">100 %</td> <td colspan="5" data-bbox="880 741 1449 813"></td> </tr> </tbody> </table> <p data-bbox="427 846 1463 913">(1), (2), (3) and (4) will be assessed by assignment/test, case study/project and final examination. (5) will be assessed by case study/project.</p> <p data-bbox="427 947 1463 1014">To pass this subject, students are required to obtain Grade D or above in <u>both</u> the Continuous Assessment and the Examination components.</p>							Specific assessment methods	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					1	2	3	4	5	a. Computer Assignments	20%	✓	✓	✓	✓	✓	b. Tests	20%	✓	✓	✓	✓		c. Examination	60%	✓	✓	✓	✓		Total	100 %									
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Reading List and References	<p data-bbox="427 1592 1455 1648"><u>Textbook:</u></p> <p data-bbox="427 1659 1455 1783">Pinedo, M. Scheduling: Theory, Algorithms, and Systems, 3rd Edition Springer, NY, 2008</p>																																																		