



# Resources to support the Advanced Higher Computing Science course

This document maps past paper questions against the course content listed in the course specification.

You can find these in the 'Past Papers and Marking Instructions' dropdown on the [Advanced Higher subject page](#).

Analysis	Past paper questions
<p>This content is common to all three sections. While questions are set in different contexts, they are useful for practising the skills, knowledge and understanding required for analysis.</p>	
<p>Identify the purpose and functional requirements of a problem that relates to the design and implementation at this level in terms of:</p> <ul style="list-style-type: none"><li>♦ inputs</li><li>♦ processes</li><li>♦ outputs</li></ul> <p>Describe, exemplify, and implement research for:</p> <ul style="list-style-type: none"><li>♦ feasibility studies:<ul style="list-style-type: none"><li>— economic</li><li>— time</li><li>— legal</li><li>— technical</li></ul></li><li>♦ user surveys</li></ul> <p>Describe, exemplify, and implement planning in terms of:</p> <ul style="list-style-type: none"><li>♦ scheduling</li><li>♦ resources</li><li>♦ Gantt charts</li></ul>	<p>2024 Q8(a)(b) 2024 Q11(a)(b) SQP Q4(a)(i)(ii) SQP Q7(a)(i)(ii) SQP Q10(a)(i)(ii) 2023 Q3(a)(b) 2023 Q7(b) 2023 Q10(b) 2022 Q4(b)(i) 2022 Q5(a)(i) 2022 Q8(a)(i)(ii) 2022 Q11(a)(i)(ii) 2019 Q4(a)</p>

<b>Analysis</b> This content is common to all three sections. While questions are set in different contexts, they are useful for practising the skills, knowledge and understanding required for analysis.	<b>Past paper questions</b>
Produce requirement specifications for end-users and develop: <ul style="list-style-type: none"> <li>◆ end-user requirements</li> <li>◆ scope, boundaries and constraints</li> <li>◆ functional requirements</li> </ul> Describe, exemplify, and implement Unified Modelling Language (UML): <ul style="list-style-type: none"> <li>◆ use case diagrams: <ul style="list-style-type: none"> <li>— actors</li> <li>— use cases</li> <li>— relationships</li> </ul> </li> </ul>	

# Software design and development

Phase	Skills, knowledge and understanding	Past paper questions
Design	<p>Identify the data types and structures required for a problem that relates to the implementation at this level.</p> <p>Read and understand designs of solutions to problems at this level using the following design techniques:</p> <ul style="list-style-type: none"> <li>◆ structure diagrams</li> <li>◆ pseudocode</li> <li>◆ UML</li> </ul> <p>Exemplify and implement efficient design solutions to a problem at this level, using pseudocode, showing:</p> <ul style="list-style-type: none"> <li>◆ top level design</li> <li>◆ the data flow</li> <li>◆ refinements</li> </ul> <p>Describe, exemplify, and implement UML for the following:</p> <ul style="list-style-type: none"> <li>◆ class diagrams: <ul style="list-style-type: none"> <li>— class name</li> <li>— instance variables and data types</li> <li>— methods</li> <li>— public and private</li> <li>— inheritance</li> <li>— constructor</li> <li>— array of objects</li> </ul> </li> </ul> <p>Describe, exemplify, and implement user-interface design using a wireframe, indicating:</p> <ul style="list-style-type: none"> <li>◆ visual layout</li> <li>◆ inputs</li> <li>◆ validation</li> <li>◆ underlying processes</li> <li>◆ outputs</li> </ul>	<p>2024 Q5(d)(i)(ii)(iii)</p> <p>2024 Q6(a)(b)(i)(ii)(iii)</p> <p>SQP Q2(a)(b)</p> <p>SQP Q3(c)(ii)</p> <p>SQP Q4(b)(iii)(iv)</p> <p>2023 Q4(d)(i)</p> <p>2023 Q5(a)(i)(ii)(iii)</p> <p>2023 Q5(b)</p> <p>2022 Q1</p> <p>2022 Q2(a)(b)</p> <p>2022 Q3(a)(b)</p> <p>2022 Q5(c)</p> <p>2019 Q1</p> <p>2019 Q3(a)(ii)</p> <p>2018 Q4(c)</p>

Phase	Skills, knowledge and understanding	Past paper questions
Implementation	<p><b>Data types and structures</b> Describe, exemplify, and implement the following structures in solutions to problems at this level:</p> <ul style="list-style-type: none"> <li>◆ parallel 1-D arrays</li> <li>◆ records</li> <li>◆ arrays of records</li> <li>◆ 2-D arrays</li> <li>◆ array of objects</li> </ul> <p>Describe and exemplify the operation of linked lists (double and single).</p> <p><b>Computational constructs</b> Describe, exemplify, and implement the following object-oriented constructs:</p> <ul style="list-style-type: none"> <li>◆ object</li> <li>◆ property</li> <li>◆ method</li> <li>◆ class</li> <li>◆ sub-class</li> <li>◆ encapsulation</li> <li>◆ inheritance</li> <li>◆ instantiation</li> <li>◆ polymorphism</li> </ul> <p>Describe, exemplify, and implement code to:</p> <ul style="list-style-type: none"> <li>◆ open and close connection to database server</li> <li>◆ execute SQL query</li> <li>◆ format query results</li> </ul> <p><b>Algorithm specification</b> Describe, exemplify, and implement standard algorithms including:</p> <ul style="list-style-type: none"> <li>◆ binary search</li> <li>◆ insertion sort</li> <li>◆ bubble sort</li> </ul> <p>Read and explain code that uses constructs appropriate to this level.</p>	<p>2024 Q1 2024 Q2(a)(b) 2024 Q3(a)(b) 2024 Q5(a)(b)(i)(ii) 2024 Q5(c)(i)(ii) SQP Q1 SQP Q3(a)(b) SQP Q3(c)(i)(iii) SQP Q3(d) SQP Q4(b)(i)(ii) 2023 Q1 2023 Q2(a)(b)(i)(ii)(iii) 2023 Q4(a)(b) 2023 Q4(c)(i)(ii)(iii) 2023 Q4(d)(ii) 2022 Q4(a)(b)(ii)(c) 2022 Q4(d)(i)(ii)(iii) 2022 Q5(a)(ii)(iii)(b) 2019 Q1 2019 Q3(a)(i)(c) 2019 Q4(b)(c)(d) 2018 Q1(d) 2018 Q3(a)(b)(c)(d) 2018 Q3(e)(i) 2018 Q4(a)(i)(ii)</p>

# Database design and development

Phase	Skills, knowledge and understanding	Past paper questions
Design	<p>Describe, exemplify, and implement entity-relationship diagrams with three or more entries indicating:</p> <ul style="list-style-type: none"> <li>◆ entity name</li> <li>◆ entity type (strong, weak)</li> <li>◆ attributes</li> <li>◆ relationship participation (mandatory, optional)</li> <li>◆ name of relationship</li> <li>◆ cardinality</li> </ul> <p>Identify relationship participation from an entity-occurrence diagram.</p> <p>Describe, exemplify, and implement surrogate keys.</p> <p>Describe and exemplify a data dictionary, in relation to SQL, with three or more entities for the following:</p> <ul style="list-style-type: none"> <li>◆ entity name</li> <li>◆ attribute name</li> <li>◆ primary and foreign key</li> <li>◆ attribute type: <ul style="list-style-type: none"> <li>— varchar</li> <li>— integer</li> <li>— float</li> <li>— date</li> <li>— time</li> </ul> </li> <li>◆ attribute size</li> <li>◆ validation: <ul style="list-style-type: none"> <li>— presence check</li> <li>— restricted choice</li> <li>— field length</li> <li>— range</li> </ul> </li> </ul>	<p>2024 Q7(a)(b)  2024 Q8(c)  SQP Q6  SQP Q7(b)(i)(ii)(e)  SQP Q7(e)  2023 Q6(a)(b)  2022 Q7  2022 Q8(b)(d)(i)  2019 Q2(b)(d)</p>

Phase	Skills, knowledge and understanding	Past paper questions
Design (continued)	<p>Exemplify a design of a solution to a query using:</p> <ul style="list-style-type: none"> <li>◆ tables and queries</li> <li>◆ fields</li> <li>◆ search criteria</li> <li>◆ sort order</li> <li>◆ calculations</li> <li>◆ grouping</li> <li>◆ having</li> </ul>	

Phase	Skills, knowledge and understanding	Past paper questions
Implementation	<p><b>SQL</b></p> <p>Implement relational database using SQL Data Definition Language (DDL) and Data Manipulation Language (DML) to match the design.</p> <p>Describe, exemplify, and implement the following SQL operations:</p> <ul style="list-style-type: none"> <li>◆ CREATE statement: <ul style="list-style-type: none"> <li>— CREATE DATABASE</li> <li>— CREATE TABLE</li> <li>— constraints: <ul style="list-style-type: none"> <li>○ primary key</li> <li>○ foreign key</li> <li>○ not null</li> <li>○ check</li> <li>○ auto increment</li> </ul> </li> </ul> </li> <li>◆ DROP statement: <ul style="list-style-type: none"> <li>— DROP DATABASE</li> <li>— DROP TABLE</li> </ul> </li> <li>◆ HAVING clause of the SELECT statement</li> <li>◆ subqueries used with the WHERE clause of SELECT statements</li> <li>◆ data types: <ul style="list-style-type: none"> <li>— varchar</li> <li>— integer</li> <li>— float</li> <li>— date</li> <li>— time</li> </ul> </li> <li>◆ logical operators: <ul style="list-style-type: none"> <li>— IN</li> <li>— NOT</li> <li>— BETWEEN</li> <li>— ANY</li> <li>— EXISTS</li> </ul> </li> </ul> <p>Read and explain code that uses the SQL at this level.</p>	<p>2024 Q7(c)</p> <p>2024 Q8(d)(e)(ii)</p> <p>2024 Q8(f)(i)(ii)</p> <p>2024 Q11(c)(iii)</p> <p>SQP Q5</p> <p>SQP Q7(c)(d)(i)(ii)</p> <p>SQP Q10(d)(i)</p> <p>2023 Q7(c)(d)(e)(f)</p> <p>2022 Q6</p> <p>2022 Q8(c)(d)(ii)</p> <p>2019 Q2(b)</p> <p>2018 Q2(a)</p>

## Web design and development

Phase	Skills, knowledge and understanding	Past paper questions
Design	<p>Describe, exemplify, and implement wireframe designs showing:</p> <ul style="list-style-type: none"> <li>◆ visual layout</li> <li>◆ navigation</li> <li>◆ consistency</li> <li>◆ underlying processes</li> </ul> <p>Describe, exemplify, and implement low-fidelity prototype from wireframe design.</p> <p>Read and understand designs of server-side processes at this level, using the following design techniques:</p> <ul style="list-style-type: none"> <li>◆ structure diagrams</li> <li>◆ pseudocode</li> </ul> <p>Exemplify and implement the design of server-side processes using pseudocode.</p>	<p>2024 Q11(c)(i)(d)(i)</p> <p>2024 Q11(f)(i)(ii)</p> <p>SQP Q10(d)(ii)</p>



Phase	Skills, knowledge and understanding	Past paper questions
Implementation	<p><b>CSS</b> Describe, exemplify, and implement responsive pages using the following media queries:</p> <ul style="list-style-type: none"> <li>◆ media type: <ul style="list-style-type: none"> <li>— print</li> <li>— screen</li> </ul> </li> <li>◆ media feature: <ul style="list-style-type: none"> <li>— max-width</li> </ul> </li> </ul> <p><b>HTML</b> Describe, exemplify, and implement form elements including:</p> <ul style="list-style-type: none"> <li>◆ FORM element: <ul style="list-style-type: none"> <li>— action</li> <li>— method (get and post)</li> </ul> </li> <li>◆ INPUT, SELECT and TEXTAREA elements: <ul style="list-style-type: none"> <li>— name</li> <li>— value</li> </ul> </li> <li>◆ TABLE element: <ul style="list-style-type: none"> <li>— th, tr, td</li> </ul> </li> </ul> <p><b>PHP</b> Describe, exemplify, and implement coding of server-side processing to:</p> <ul style="list-style-type: none"> <li>◆ assign form data to server-side variables: <ul style="list-style-type: none"> <li>— \$_get()</li> <li>— \$_post()</li> </ul> </li> <li>◆ open and close connection to database server: <ul style="list-style-type: none"> <li>— die()</li> <li>— mysqli_connect()</li> <li>— mysqli_close()</li> </ul> </li> <li>◆ execute SQL query: <ul style="list-style-type: none"> <li>— mysqli_query()</li> </ul> </li> <li>◆ format query results: <ul style="list-style-type: none"> <li>— echo</li> <li>— mysqli_fetch_array()</li> <li>— mysqli_num_row()</li> </ul> </li> </ul>	<p>2024 Q8(g) 2024 Q9 2024 Q10 2024 Q11(c)(ii)(d)(ii) 2024 Q11(e)(i)(ii) SQP Q7(f)(i)(ii) SQP Q8 SQP Q9(a)(b)(c) SQP Q10(b)(i)(ii) SQP Q10(c)(i)(ii) SQP Q10(e) 2023 Q8 2023 Q9(a)(b)(i)(ii) 2023 Q10(c)(i)(ii)(iii)(iv) 2022 Q9 2022 Q10 2022 Q11(b)(c)(d)(e) 2019 Q2(a)(d) 2018 Q2(c) 2018 Q4(a)(ii)</p>

Phase	Skills, knowledge and understanding	Past paper questions
Implementation (continued)	<p>and:</p> <ul style="list-style-type: none"> <li>◆ assignment, repetition and selection using server-side local and global variables</li> <li>◆ sessions: <ul style="list-style-type: none"> <li>— session_start()</li> <li>— session_destroy()</li> </ul> </li> </ul> <p>Read and explain code that uses constructs appropriate to this level.</p>	

<b>Testing</b>	<b>Past paper questions</b>
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<p>Describe, exemplify, and implement the following:</p> <ul style="list-style-type: none"> <li>◆ integrative testing</li> <li>◆ usability testing based on prototypes</li> <li>◆ final testing</li> <li>◆ end-user testing</li> </ul> <p>and</p> <p><b>SDD</b></p> <ul style="list-style-type: none"> <li>◆ component testing during the development of the solution</li> </ul> <p><b>DDD</b></p> <ul style="list-style-type: none"> <li>◆ SQL implemented tables match design</li> <li>◆ SQL operations work correctly at this level</li> </ul>	<p>2024 Q4(a) SQP Q4(c) 2023 Q7(g)(i)(ii) 2023 Q10(d)(i)(ii) 2022 Q8(e)(f)(i) 2022 Q11(f)(i)</p>

<b>Evaluation</b>	<b>Past paper questions</b>
<p>This content is common to all three sections. While questions are set in different contexts, they are useful for practising the skills, knowledge and understanding required for analysis.</p>	
<p>Evaluate solution in terms of:</p> <ul style="list-style-type: none"> <li>◆ fitness for purpose</li> <li>◆ maintainability <ul style="list-style-type: none"> <li>— perfective</li> <li>— corrective</li> <li>— adaptive</li> </ul> </li> <li>◆ robustness</li> </ul> <p>and</p> <p><b>DDD</b></p> <ul style="list-style-type: none"> <li>◆ accuracy of output</li> </ul> <p><b>WDD</b></p> <ul style="list-style-type: none"> <li>◆ usability</li> </ul>	<p>2024 Q4(b) 2024 Q8(e)(i) SQP Q2(c) 2023 Q7(a) 2023 Q10(a) 2022 Q8(f)(ii) 2022 Q11(f)(i) 2019 Q4(f) 2018 Q3(e)(i)</p>