Internal assessment

Purpose of internal assessment

Internal assessment is an integral part of the course and is compulsory for both SL and HL students. It enables students to demonstrate the application of their skills and knowledge, and to pursue their personal interests, without the time limitations and other constraints that are associated with written examinations. The internal assessment should, as far as possible, be woven into normal classroom teaching over a period of time and not be a short intensive activity in the course or after the course has been taught.

The internal assessment requirements at SL and at HL are the same. However, it contributes to a different percentage of the overall mark. Students are required to produce a project that consists of a cover page, the product (IT solution) and documentation. The focus of the ITGS project is on providing an original IT solution for a client.

The internal assessment component, as well as being interesting, practical and productive, forms an important part of the assessment of the ITGS course. It is imperative, therefore, that the teacher provides appropriate guidance to students.

Guidance and authenticity

The SL and HL project submitted for internal assessment must be the student's own work. However, it is not the intention that students should decide upon a title or topic and be left to work on the internal assessment component without any further support from the ITGS teacher. Both the teacher and the client for the product should play an important role during both the planning stage and the period when the student is working on the internally assessed work. It is the responsibility of the ITGS teacher to ensure that students are familiar with:

- the requirements of the type of work to be internally assessed
- the ITGS course ethical guidelines
- the assessment criteria; students must understand that the work submitted for assessment must address these criteria effectively.

Teachers and students must discuss the internally assessed work. Students should be encouraged to initiate discussions with the teacher to obtain advice and information, and students must not be penalized for seeking guidance. However, if a student could not have completed the work without substantial support from the teacher, this should be recorded on the appropriate form from the *Handbook of procedures for the Diploma Programme*.

It is the responsibility of teachers to ensure that all students understand the basic meaning and significance of concepts that relate to academic honesty, especially authenticity and intellectual property. Teachers must ensure that all student work for assessment is prepared according to the requirements and must explain clearly to students that the internally assessed work must be entirely their own.

As part of the learning process, teachers can give advice to students on a first draft of the internally assessed work. This advice should be in terms of the way the work could be improved, but this first draft must not be heavily annotated or edited by the teacher. The next version handed to the teacher after the first draft must be the final one.

All work submitted to the IB for moderation or assessment must be authenticated by a teacher, and must not include any known instances of suspected or confirmed malpractice. Each student must sign the coversheet for internal assessment to confirm that the work is his or her authentic work and constitutes the final version of that work. Once a student has officially submitted the final version of the work to a teacher (or the coordinator) for internal assessment, together with the signed coversheet, it cannot be retracted.

Authenticity may be checked by discussion with the student on the content of the work, and scrutiny of one or more of the following:

- the student's initial proposal
- the first draft of the written work
- the references cited
- the style of writing compared with work known to be that of the student.

The requirement for teachers and students to sign the coversheet for internal assessment applies to the work of all students, not just the sample work that will be submitted to an examiner for the purpose of moderation. If the teacher and student sign a coversheet, but there is a comment to the effect that the work may not be authentic, the student will not be eligible for a mark in that component and no grade will be awarded. For further details refer to the IB publication *Academic honesty* and the relevant articles in the *General regulations: Diploma Programme*.

The same piece of work cannot be submitted to meet the requirements of both the internal assessment and the extended essay.

Group work

The development of the project must be undertaken by the student on an individual basis. Collaborative or group work may not be undertaken by students.

Time allocation

It is recommended that a total of approximately 30 teaching hours for both SL and HL should be allocated to the work. This should include:

- time for the teacher to explain to students the requirements of the internal assessment, including 10 hours to introduce the systems development life cycle
- time for the teacher to explain to students the requirements of the project, including codes of ethical behaviour and confidentiality
- class time for students to work on the project
- time spent by the student making arrangements with the selected client and visiting to collect data
- time for consultation between the teacher and each student
- time to review and monitor progress, and to check authenticity.

Additional time may be needed outside normal class time for students to acquire any additional IT skills required for the project, to consult with their client and to work on their own.

Requirements and recommendations

Teachers and students will need to discuss issues relating to the design of the product, the collection of data and subsequent consultation with the client. Students should be encouraged to initiate discussions with the teacher to obtain advice and information, and will not be penalized for seeking advice.

Ethical guidelines for internal assessment

Given the nature of the project, students must take into account ethical problems and implications for undertaking research and developing the product, for example, ensuring the confidentiality and security of data. Wherever possible, original data from the client should be used or be collected by the student.

The following guidelines must be applied.

- Obtain consent from the client for whom the product is being developed before the initial investigation is begun.
- Store all data collected securely in order to maintain confidentiality.
- Give the actual data provided by the client. Do not alter or create data in their name without their express permission.
- Use the data collected for the project only; do not use it for any other purpose without the express permission of the client.
- Develop and maintain a close working relationship with the client.

Health and safety guidelines

Schools are advised to follow best practice in health and safety for ITGS research. Each school is ultimately responsible for the health and safety of students.

Using assessment criteria for internal assessment

For internal assessment, a number of assessment criteria have been identified. Each assessment criterion has level descriptors describing specific levels of achievement, together with an appropriate range of marks. The level descriptors concentrate on positive achievement, although for the lower levels failure to achieve may be included in the description.

Teachers must judge the internally assessed work at SL and at HL against the seven criteria (A–G) using the level descriptors.

- The same assessment criteria are provided for SL and HL.
- The aim is to find, for each criterion, the descriptor that conveys most accurately the level attained by the student, using the best-fit model. A best-fit approach means that compensation should be made when a piece of work matches different aspects of a criterion at different levels. The mark awarded should be one that most fairly reflects the balance of achievement against the criterion. It is not necessary for every single aspect of a level descriptor to be met for that mark to be awarded.
- When assessing a student's work, teachers should read the level descriptors for each criterion until they reach a descriptor that most appropriately describes the level of the work being assessed. If a piece of work seems to fall between two descriptors, both descriptors should be read again and the one that more appropriately describes the student's work should be chosen.
- Where there are two or more marks available within a level, teachers should award the upper marks if the student's work demonstrates the qualities described to a great extent. Teachers should award the lower mark if the student's work demonstrates the qualities described to a lesser extent.

- Only whole numbers should be recorded; partial marks, that is fractions and decimals, are not acceptable.
- Teachers should not think in terms of a pass or fail boundary, but should concentrate on identifying the appropriate descriptor for each assessment criterion.
- The highest level descriptors do not imply faultless performance but should be achievable by a student. Teachers should not hesitate to use the extremes if they are appropriate descriptions of the work being assessed.
- A student who attains a high level of achievement in relation to one criterion will not necessarily attain high levels of achievement in relation to the other criteria. Similarly, a student who attains a low level of achievement for one criterion will not necessarily attain low achievement levels for the other criteria. Teachers should not assume that the overall assessment of the students will produce any particular distribution of marks.
- The assessment criteria must be made available to students.

Internal assessment details—SL and HL

Project

Duration: 30 hours
Maximum mark: 30
Weighting: SL 30%; HL 20%

Introduction

The requirement of the project is to develop an original IT solution to a real problem for a specified client. Students should undertake a challenging task using advanced techniques published annually on the OCC to demonstrate their practical IT and project management skills.

Key terms

The terms *developer* and *student* are synonymous. In this scenario the developer is the student.

The terms *product* and *IT solution* are interchangeable. In general, the IT solution refers to the product before it has been completed.

Choice of topic

In identifying a problem, students can select any topic that interests them. It does not have to be directly related to the specified themes in the syllabus.

There are several possibilities in choosing the client: the client chosen may be from inside the school environment, but must not be the ITGS teacher, or from outside the school, such as family or friends.

Examples of clients from within the school could include the following.

- The IB Diploma Programme theatre teacher (**client**) requires a method of managing the finance and seat booking for a school theatre production (**problem**). A possible solution is to develop a multiple-page spreadsheet that links a diagrammatic representation of the seating plan with the financial information.
- The IB Primary Years Programme or kindergarten teacher (**client**) requires a method to introduce the basic greetings in another language to 4-year-olds (**problem**). A possible solution is to develop a multimedia presentation that includes a series of sound and video clips.

- The IB Diploma Programme history teacher (**client**) requires an effective way for students to record and analyse information obtained from a scheduled field trip (**problem**). A possible solution is to develop a comprehensive desktop-published workbook including the development of a reusable template and the significant manipulation of images.

Examples of clients from outside the school could include the following.

- A photographer (**client**) requires a method of increasing his visibility and consequently his income from the sale of images (**problem**). A possible solution is to develop a website.
- A manager of a local sports team (**client**) requires a method of keeping accurate records of players' details, attendance at training sessions and performance throughout the season (**problem**). A possible solution is to develop a relational database.

Students will need to work closely with the client throughout the lifetime of the project. Therefore, it is recommended that, wherever possible, students select a client who is known to them or their family. This could also include members of the school community, local clubs and/or businesses. It is strongly advised that a contributor's agreement is signed.

Requirements

The project consists of three parts.

- A cover page
- The product (IT solution)
- The documentation

All must be submitted for moderation in digital rather than hard copy format. Instructions for the submission of student work can be found in the *Handbook of procedures for the Diploma Programme*.

Project components

Cover page

The cover page form is included within a ZIP file in either HTML or TXT format, available on the OCC. The cover page form must be used.

The cover page must be submitted in HTML format and provide access to the product and the documentation via **relative** hyperlinks.

The cover page is not included in the overall word count for the project.

If additional information to access or locate the product is required—for example, a username and password—this must be provided in the cell provided on the cover page.

The cover page must be called [cand_no]_[cand_name]_CoverPage.htm and be located in the top-level folder.

Product

The product is the IT solution.

Students should aim to develop a product that uses advanced techniques (see the list of appropriate techniques for the development of the project on the OCC), is fully functional, and the complete internal structure of the product must be available for moderation.

It should be noted that products created using templates that show no evidence of modification in their structure, design or functionality are not permitted. Examples of **inappropriate** products include:

- the development of a website (product) using a web-based template that completely determines its structure and layout
- a product consisting of a data mashup consisting only of secondary data
- the use of unmodified exemplar products or templates provided with software such as the Northwind database in Microsoft Access®.
- Any text within the product is not included in the overall word count for the project.

Documentation

To assist students in the development and submission of the project, the ZIP file contains the cover page, analysis form, project schedule form and product design form.

The documentation must consist of eight files.

The final documentation consists of the following.

- **Information added to forms** to provide evidence of the analysis, a project schedule and the design of the product.

  The information added to the forms must be in the following style(s):

  – bullet points or tables to list information

  – scanned diagrams or other appropriate images as part of the design process

  – other styles of non-extended writing or diagrammatic representation such as flow charts, Gantt charts or spider diagrams where appropriate.

  This information is not included in the word count unless the student includes extended writing. In this case, the words will be included in the word count.

  The templates in the ZIP file must be used.

- **A series of documents** that use text (continuous writing) that:

  – identifies the client's problem and explains how the present scenario is inadequate

  – justifies the rationale behind the choice and development of the IT solution

  – evaluates the success of the product in resolving the existing inadequacies.

  This is the **only** information included in the word count and **must not exceed 2,000 words**.

  It is recommended that the templates in the ZIP file are used.

- **Evidence of consultation with the client**, such as a written record of the interview (either a summary or transcript), a sound file, a video, or an exchange of emails that may be supported by a questionnaire, providing evidence of the initial consultation and the gathering of feedback from the client after the product is completed. This information must be referenced under the appropriate criterion heading, and is not included in the word count.

  It is recommended that the name of the client and their occupation and the date of the consultation are clearly stated.

  Because of the different media that can be used, there are no templates in the ZIP file for evidence of consultation between the student and the client.

Organization of documentation

The documentation must be located in the **documentation folder** and consist of eight files. It is associated with criteria A–F.

The following table indicates the content and nature of each of the files and the criterion that it relates to.

File	Nature of submission	Criterion
Initial investigation [of problem]	Text	A
Initial consultation [with client]	Methods such as a written record of the interview (either a summary or transcript), a sound file, a video, or an exchange of emails that may be supported by a questionnaire	A
Analysis	Analysis form including additional text	B
Project schedule	Project schedule form	C
Product design	Product design form	D
Product development	Text with screenshot evidence	E
Feedback from client	Methods such as a written record of the interview (either a summary or transcript), a sound file, a video, or an exchange of emails that may be supported by a questionnaire	F
Product evaluation and future product development	Text	F

It is strongly recommended that the documentation is submitted in a commonly used format such as PDF, RTF or TXT.

Appendices are not required.

Development of the project

Students are advised to use the following guidelines to produce their project. This will ensure it fulfills the requirements of the criteria.

When developing the ITGS project, the student must follow the processes as set out in each of the criteria. Criteria A–D inclusive must be reviewed by the teacher before allowing the student to proceed to making the product in criterion E.

Criterion A: Initial investigation and initial consultation with client

The client and the information problem

The student must identify a specific client who has a problem with the present situation that can be best addressed by an IT solution. The client is the person(s) who needs the IT solution (product). After consulting with the client, the student must explain the inadequacies of the present situation, which may or may not involve the use of an IT system.

The following key questions should be considered.

- Who is the client?
- What is the present situation?
- What are the inadequacies of the present situation?

This information must be obtained from the client and can be presented in a variety of ways, such as a written record of the interview (either a summary or transcript), a sound file, a video, or an exchange of emails that may be supported by a questionnaire.

Criterion B: Analysis

The student must ensure that the proposed IT solution addresses the inadequacies identified in criterion A.

The **analysis form** must be used.

The analysis must consist of the following two parts, which must be submitted as a single document.

- A completed requirements specification using the first section of the form
- Justification for the proposed solution, as extended writing using the second section of the form

Requirements specification

The following information must be included.

- System interaction
- Input and output requirements
- Processing
- Security
- Specific performance criteria that are evaluated in criterion F to determine the effectiveness of the solution

Justification of proposed solution

The rationale behind the choice of the proposed solution must be in **extended writing** justifying how the choice of this particular product is the most effective IT solution to the problem identified in criterion A. It is expected that this is based largely on the information within the requirements specification.

Other information that can be included in the justification for the proposed IT solution may refer to:

- whether the student has the IT skills and access to the software required to develop the IT solution
- whether the client's hardware and software is compatible with the IT solution
- the level of training necessary for the client to use and maintain the proposed IT solution
- to what extent the input and output requirements of the client are met by the IT solution
- whether the data required for the IT solution can be obtained by either the client or the student
- how any security implications for the development and operation of the IT solution can be resolved.

Criterion C: Project schedule

The **project schedule form** must be used.

The project schedule must be implemented for the proposed IT solution in criterion B.

A plan based on the research into the proposed IT solution and the factors involved (stakeholders, software, hardware, network requirements, data, input and output, processes and policies) is developed that addresses:

- the key events in planning, designing, developing, testing and implementing the product in the form of a timeline
- any other issues that may arise which may affect the development of the product.

Criterion D: Product design

The **product design form** must be used. It should include:

- design methodologies appropriate to the type of IT product being designed
- different levels of draft design, such as the overall structure as well as the internal layout of the product itself. This can also include investigation into specific elements used within the product (such as fonts, graphic elements, effects)
- identification of a range of appropriate resources and techniques required for the development of the product
- evidence of a test plan that addresses the main areas of functionality of the product
- evidence of the agreement of the client to develop the product.

The product design should be in sufficient detail so the product could be independently created by an IT-literate third party.

Criterion E: Product development

The product is created using the information submitted in the requirements specification (criterion B), project schedule (criterion C) and the product design (criterion D).

The student must present a list of the techniques used in the product at the start of this criterion.

A complex product is defined as one that includes at least three appropriate advanced techniques. The list of techniques will be posted on the OCC annually.

A simple product cannot be awarded more than 4 marks for criterion E.

The information in the documentation linked to the development of the product must provide a detailed account, using extended writing, to justify the following.

- The structure of the product and why it is appropriate
- The techniques used (see the list on the OCC), including screenshots, in the development of the product, and reasons why they are appropriate to it
- Additional technical information, if appropriate, that will support the functionality of the product, such as web hosting or security information

Any reference material such as templates, program code, applets or other materials that have been used or modified must be acknowledged. Failure to do so will be considered a significant omission.

Criterion F: Product evaluation and future product development

This criterion should be completed as two parts. The first part deals with the evaluation of the product by the client, including any feedback given and including any problems identified. The second part makes recommendations for the future development of the product.

Feedback from client

This information must be obtained from the client and can be presented in a variety of ways, such as a written record of the interview (either a summary or transcript), a sound file, a video, or an exchange of emails that may be supported by a questionnaire.

The evaluation of the completed product should refer directly to the specific performance criteria that form part of the requirements specifications in criterion B, as well as any other appropriate feedback obtained from the client at handover.

Recommendations for the future development of the product

The student will use the client feedback and the evaluation of the specific performance criteria to recommend possible future developments to the product. These recommendations should succinctly explain how possible future developments of the product will be of benefit to the client and/or other stakeholders.

Criterion G: Required elements

The three required elements are marked independently.

1. The content and functionality of the product are sufficient to reliably evaluate its effectiveness.

   If the product contains insufficient content to reliably evaluate its effectiveness, such as a database with insufficient records to test the output of queries or a single-page website, this required element has not been fulfilled and no marks will be awarded.

   If the product does not function as intended, this required element has not been fulfilled and no marks will be awarded.

2. The prescribed cover page is used and functions as required.

   The prescribed cover page has been used and the moderator can successfully use this to navigate to both the product and the documentation.

   – If the links do not function, this required element has not been fulfilled and no marks will be awarded.

   – If the nature of the product means it cannot be directly accessed by the link, there must be clear and concise instructions on the cover page. If they are not sufficiently clear for the moderator to easily locate the product, this required element has not been fulfilled and no marks will be awarded.

3. Folder structure and file naming.

   Folder structure

   The project should be organized in such a way that there is evidence of the use of appropriate folder names and structures that enable individual files to be located if links fail.

   File naming

   The project should be organized in such a way that there is evidence of:

   – the use of appropriate file names to enable the client or an IT-literate third party to be able to locate and modify files if necessary

   – the use of an appropriate file-naming convention that would allow either the client or an IT-literate third party to make future modifications to the product.

   If the product does not demonstrate appropriate file names and folder structures, this required element has not been fulfilled and no marks will be awarded.

Assessing the project

There are seven criteria for the project.

The criteria should be applied systematically against the relevant parts of the project.

- The documentation supporting the product is assessed in criteria A–F inclusive.
- The functionality and organization of the product and cover page are assessed in criterion G.

Criterion	Marks
Criterion A: Initial investigation	3
Criterion B: Analysis	5
Criterion C: Project schedule	3
Criterion D: Product design	4
Criterion E: Product development	8
Criterion F: Product evaluation and future product development	4
Criterion G: Required elements	3
Total	30

Internal assessment criteria—SL and HL

Criterion A: Initial investigation

Marks	Level descriptor
0	The work does not reach the standard described by the descriptors below.
1	A client **and** a problem with the present situation are identified.
2–3	A client is identified. The inadequacies of the present situation are explained with cited reference to the consultation with the client.

Criterion B: Analysis

Requirements specification

The specific performance criteria within the requirements specification will be used in criterion F to evaluate the effectiveness of the product.

Justification of proposed solution

This is completed in extended writing.

Marks	Level descriptor
0	The work does not reach the standard described by the descriptors below.
1	The analysis form is used, refers to the scenario described in criterion A **and** includes either a requirements specification that can be used to partially evaluate the effectiveness of the IT solution **or** a limited explanation of why the IT solution was chosen.
2–3	The analysis form is used, refers to the scenario described in criterion A **and** includes a requirements specification that can be used to partially evaluate the effectiveness of the IT solution **and** an adequate explanation of why the IT solution was chosen.
4–5	The analysis form is used, refers to the scenario described in criterion A **and** includes a requirements specification that can be used to effectively evaluate the success of the IT solution **and** a detailed justification of why the IT solution was chosen.

Criterion C: Project schedule

The project schedule must include the following.

- Dates
- Actions
- Details

Marks	Level descriptor
0	The work does not reach the standard described by the descriptors below.
1	The project schedule uses the project schedule form **and** refers to the proposed IT solution identified in criterion B, providing an outline schedule of the tasks involved in planning, designing, developing, testing and implementing the IT solution.
2–3	The project schedule uses the project schedule form **and** refers to the proposed IT solution identified in criterion B, providing a detailed schedule of the tasks involved in planning, designing, developing, testing and implementing the IT solution. The project schedule can be used as a basis for the development of the IT solution.

Criterion D: Product design

There are four significant components to the product design.

- Overall structure
- Internal structure
- List of resources
- List of techniques

The following information should also be included as part of the product design.

- Test plan
- Agreement of client

Marks	Level descriptor
0	The work does not reach the standard described by the descriptors below.
1–2	The product designs for the IT solution identified in criterion B use the product design form but have significant omissions. It is possible for the student to create the product from them, but they lack sufficient detail for an IT-literate third party to see how the product was created.
3–4	The product designs for the IT solution identified in criterion B use the product design form and include sufficient detail for an IT-literate third party to see how the product was created.

Criterion E: Product development

The student must demonstrate the techniques, with screenshots, that were used to develop the IT solution identified in criterion B for the client identified in criterion A and justify why they have been used.

A complex product is defined as one that includes at least three appropriate advanced techniques. The list of techniques will be posted on the OCC annually.

Marks	Level descriptor
0	The work does not reach the standard described by the descriptors below.
1–2	The IT solution identified in criterion B is created. The techniques used to develop the complex product are identified **or** the techniques used to develop the simple product are described.
3–4	The IT solution identified in criterion B is created. The structure of the complex product **and** the techniques used to develop it are described (with screenshots) **or** the structure of the simple product and the choice of techniques used to create it are justified (with screenshots).
5–6	The IT solution identified in criterion B is created. The structure of the complex product **and** the choice of techniques used to develop it have been explained (with screenshots), with minor omissions. Sources have been acknowledged.
7–8	The IT solution identified in criterion B is created. The structure of the complex product **and** the choice of techniques used to develop it have been fully justified (with screenshots). Sources are cited appropriately.

Criterion F: Product evaluation and future product development

The student must evaluate the effectiveness of the finished product, based on feedback from the client. This must include direct references to the specific performance criteria identified in the requirements specification as part of criterion B.

The student must recommend proposals for future improvements of the product.

Marks	Level descriptor
0	The work does not reach the standard described by the descriptors below.
1–2	A limited evaluation of the product, based on feedback from the client is completed, and superficial and impractical recommendations are made for its further development. There is limited reference to the specific performance criteria identified in the requirements specification.
3–4	The product is evaluated, based on feedback from the client and the specific performance criteria identified in the requirements specification, **and** appropriate recommendation(s) are made for future development of the product.

Criterion G: Required elements

This criterion assesses the extent to which the three formal requirements are met.

- The content within the product is sufficient for an IT-literate third party to reliably evaluate its effectiveness **and** the product functions as required.
- The prescribed cover page is used and functions as required.
- Appropriate file names and folder structures are used throughout the project.

Marks	Level descriptor
0	None of the formal requirements are met.
1	Any **one** of the formal requirements is met.
2	Any **two** of the formal requirements are met.
3	All **three** of the formal requirements are met.