5.6 SOP FOR ASSESSMENT

- The planning and management of the assessment policy is the responsibility of the Dental Education department.
- The policy is prepared in compliance with the standards given by the National University of Medical Sciences (NUMS) and the Pakistan Medical & Dental Council (PM&DC).

5.6.1. Key Definitions

Assessment	A systematic method is used to obtain information from tests and other sources to draw inferences about students' characteristics and the BDS program at Dental College, HITEC-IMS.
Academic Council	The Academic Council of the Dental College HITEC-IMS comprises the Principal, Vice Principal, Associate Deans, and HoDs of all academic departments.
Internal Assessment	Student learning is continuously assessed throughout the academic year.
Formative Assessment	A component of internal assessment that is done to identify deficiencies in student learning, provide feedback and modify instruction if required. If these are scored, their marks are not carried forward toward the final scores.
Summative Assessment	Component of internal assessment, scores of which will contribute to the aggregate scores of the year. These include end-of-block and pre-annual exams.
Assessment Blueprint	Detailed table showing the weight assigned to the assessment tools used to assess the learning outcomes.
Head Of The Institute	The Principal of the Dental College, HITEC-IMS.
Department	A teaching department maintained and administered by the Dental College, HITEC-IMS.
Examination	A specific type of assessment is used to measure or quantify the achievement of specific learning objectives, particularly cognitive achievement.
External Examiner	A faculty member holding suitable qualifications recognised by PM&DC in the relevant discipline who belongs to any other medical college/university.
Internal Examiner	A faculty member is appointed as examiner after approval by the Principal of the Dental College, HITEC-IMS, from within the college.
Grade	A numerical calculation or expression aimed at measuring or gauging the quality or level of a student's performance in a given subject.
Learning Outcomes	Statements that describe significant and essential learning that learners have achieved and can reliably demonstrate at the end of the BDS program.
Professional Examination:	An external examination conducted for BDS by the university, based on which a student is declared as a pass or a fail.
Table Of Specifications	A basic framework for showing alignment between learning outcomes, modes of information transfer and assessment tools.
University	The college is affiliated with the National University of Medical Sciences (NUMS), established under Act No. XVII of 2015.
Weightage	The percentage contribution of the assessment towards the final aggregate. All weights will add up to 100%.

5.6.2. RATIONALE OF ASSESSMENT

- Any assessment aims to make inferences (decisions, judgements, or conclusions) about examinees' skills. These inferences should be generalisable from the particular set of items included in the examination into the larger domain from which the items were sampled.
- Assessments set the tone for how students will study. For example, recall assessments promote rote learning, whereas high-fidelity, context-based (scenario/vignette) questions encourage problem-solving by applying knowledge.
- Assessment drives learning, catalysing motivation to study.
- Help identify learning content areas that are deficient, need remediation, or require further learning.
- Help identify content areas where the instruction methods can be improved.
- Determine competency in each content area and provide summative value judgments such as marks and grades.

5.6.3. ASSESSMENT METHODS

a) Selected Response Questions
- Multiple Choice Questions (MCQs)

b) Constructed Response Questions
- Short Answer Questions (SAQs)
- Case-Based Learning (CBL)
- Objective Structured Practical Examination (OSPE)

c) Observation of Clinical Performance
- Objective Structured Clinical Examination (OSCE)
- Direct Observation of Procedural Skills (DOPS)
- Mini-Clinical Evaluation Exercise (Mini-CEX)
- Short & Long Clinical Cases.
- Logbooks.

5.6.4. SUMMATIVE ASSESSMENTS

5.6.4.1. End of Block Examinations (EoB)

- There will be three EOB theory exams at the end of each of blocks I, II, and III to assess students' knowledge and concepts, along with a Pre-Annual Examination, for a total of 04 examinations per year.
- Assessment via integrated OSPE, OSCE, CBLs, Long/Short Cases, DOPS, and Mini-CEX will be conducted at the end of each block exam to evaluate students' skills and attitudes.
- The syllabi, schedule, and date for the EoB exam will be announced at least 02 weeks before the examination.
- The respective faculty will determine the appropriate assessment tools for each assessment based on their assigned blueprint.
- The Pre-Annual examination will include theory and practical assessments and will be conducted after the completion of the curriculum.
- The Pre-Annual examination will cover the entire year's syllabus. The Table of Specifications (ToS) for the Pre-Annual examination will be the same as that of the annual professional examination.

- Pre-, Per- and Post-hoc examination analyses will be conducted by the dental education department in accordance with the given SOPs.
- The utilisation of assessment tools will align with the learning objectives (knowledge, skills, and attitudes) outlined in the curriculum.
- All information regarding scheduling and the nature of examinations will be made known to the students.
- As per the PM&DC policy, the pass percentage for all examinations will be 50%, and eligibility for appearance in the examination will be 75% attendance.
- Knowledge, concepts, and their application will be assessed primarily through context-rich clinical-scenario/vignette-based MCQs and SEQs.
- Structured OSPE, OSCE, Long/Short Cases, DOPS, and Mini-CEX will be utilised to assess skills and affective domains.

5.6.4.2. 1st Year BDS Integrated Examinations

- 02 Theory examinations, Paper I & Paper II will be conducted per block in the 1st Year BDS.
- Paper I shall comprise an integrated examination of Anatomy, Physiology, and Biochemistry, along with vertically integrated learning objectives.
- Paper II shall comprise Oral Biology along with vertically integrated learning objectives.
- Each EoB examination shall include only the learning content covered in that block.
- OSPE/Viva shall be conducted in a temporally integrated manner.

5.6.4.3. 2nd Year BDS Integrated Examinations

- 02 Theory examinations, Paper I & Paper II will be conducted per block in the 2nd Year BDS.
- Paper I shall comprise an integrated examination of Dental Materials, Community Dentistry & Vertically Integrated Prosthodontics & Operative Dentistry.
- Paper II shall comprise an integrated examination of Pharmacology & General Pathology.
- Each EoB examination shall include only the learning content covered in that block.
- OSPE/Viva shall be conducted in a temporally integrated manner.

5.6.4.4. Annual Professional Examination SOPs

- The annual exam will be conducted in accordance with the NUMS assessment policy.
- Only application-based SAQs will be utilised in theory examinations from the academic year 2025 onwards.

5.6.4.4.1. For 1st Year BDS Integrated Annual Professional Examinations

- The Written and Oral/Practical/Clinical examinations in each paper will carry 150 marks each, making the total marks of 300 for each paper of papers I to IV.
- The duration of each written paper will be 180 minutes (03 hours). The MCQ section will be 90 minutes, and the SAQ section will be 90 minutes.

- There will be a total of 84 MCQs of one mark each and 09 SAQs of 4 Marks each SEQs/ SAQs in every written paper in Papers I to IV.
- Regarding annual professional integrated examinations of 1st Year BDS, 05 theory examinations shall be conducted, named as Papers I-V.
- Papers I, II & III shall comprise of learning content of 1st, 2nd and 3rd blocks of Anatomy, Physiology & Biochemistry (along with assessment of integrated learning objectives)
- Paper IV shall consist of the learning contents of all three blocks of Oral Biology, along with integrated learning objectives.

5.6.4.4.2. For 2nd Year BDS Integrated Annual Professional Examinations

- The theory and practical examination for Paper I will carry 150 marks each, for a total of 300 marks.
- The theory and practical examination for Paper II will carry 100 marks each, for a total of 200 marks.
- The duration of each written paper will be 180 minutes (03 hours). The MCQ section will be 90 minutes, and the SAQ section will be 90 minutes.
- For Paper I, there will be 84 MCQs of one mark each and 9 SAQs for 4 marks each for every theory examination.
- For Paper II, there will be 56 MCQs of one mark each and 6 SAQs for 4 marks each for every theory examination.
- Regarding annual professional integrated examinations of 2nd Year BDS, 06 theory examinations shall be conducted, 1st, 2nd and 3rd block examinations of Paper I and Paper II.
- Paper I shall comprise an integrated examination of Dental Materials, Community Dentistry & Vertically Integrated Prosthodontics & Operative Dentistry.
- Paper II shall comprise an integrated examination of Pharmacology & General Pathology.
- Paper III shall consist of an assessment of Islamiyat & Pakistan Studies.

5.6.4.4.3. For both 1st and 2nd Year BDS Annual Professional Examinations

- MCQs and SEQs/SAQs in each paper will be in a 70:30 ratio.
- Questions will not be arranged discipline-wise, including MCQS & SAQS, ensuring module-wise vertical integration
- An integrated OSPE and Vice-Voce examination shall be conducted in accordance with the University-provided format.
- It is mandatory to pass each paper with a minimum of fifty percent (50%) marks in the Written and fifty per cent (50%) in the Oral/Practical/Clinical examinations. However, to ensure quality, it is also mandatory to secure a minimum of 40% marks in each subject in professional papers (I, II, III & IV), with theory and practical separately.
- Regarding Supplementary Exams, the failing student will repeat the whole paper in which he/she secures less than 50% Marks (both theory & Practical) in total or in any subject.

5.6.5. FORMATIVE/ CONTINUOUS ASSESSMENT

- Continuous assessment will be carried out throughout the year, and feedback will be provided to students to inform and address learning gaps.

5.6.5.1. Responsibilities

The HoDs will ensure the students are assessed formatively and receive yearly feedback.

5.6.5.2. Procedures

- Formative assessment will include, but is not limited to, quizzes, practice questions, assignments, group projects, and presentations.
- If deficiencies are found in any student's academic performance, a plan may be developed with the student to ensure all requirements are met by the end of the year.
- Students must have access to the HoD or their faculty designee throughout the course to solicit additional feedback regarding their performance.

5.6.6. INTERNAL ASSESSMENT

a) The weightage of the internal assessment will be 20% each for theory and practical in the BDS Professional Examination.
b) The Internal Assessment will comprise 1st, 2nd & 3rd End of Block and Pre-Annual exam results, along with class test results and student attendance records.
c) The Internal assessment record will be kept in the respective department of the dental college, HITEC-IMS, and a summary as per the university registration number will be sent to the Controller of Examinations (NUMS) at least two weeks before the commencement of the final examination.
d) The same internal assessment will count for both the annual and supplementary examinations. The relegated students, however, can improve the internal assessment during the subsequent year.

5.6.7. ACADEMIC GRIEVANCES

5.6.7.1. Purpose

- After the college examination results have been displayed, a student can apply for grade revision/re-counting of exam results if he/she has certain doubts about the marking results.

5.6.7.2. Procedure for Grade Revision

The following steps would be required by the student for his/her grade revision:

- A student can request his/her grade revision within five working days after the declaration of results on the college notice board.
- The student will submit the grade revision form, available from the college website, to the institutional examination cell. (Refer to Annexure IX for sample performa)
- Students who have passed (obtained 50% marks in the relevant examination) cannot apply for grade revision.
- Only students who did not pass the examination by a deficiency of 05 marks will be considered for grade revision.
- Any student can apply for a recount of their marks.

5.6.7.3. Grade Revision Criteria

- During the grade revision process, the following will be taken into consideration:

- All the students' answers have been awarded marks.
- All total marks have been accurately brought forward on the title page of the answer booklet.
- No portion of any answer has been left ungraded.
- Total marks in the answer booklet accurately tally with the result sheet.
- There is no computational/typing error in the grand total.
- As class discussions are held for the display and feedback on examination papers, students' solved answer booklets will not be shown to them for grade revision.
- If there is an increase or decrease in marks, the result shall be updated accordingly.
- If the concerned departments find any discrepancy in the candidate's marks, the record shall be corrected accordingly, and the revised result will be communicated to the institutional examination cell for necessary updating in the record.

5.6.8. ONLINE ASSESSMENT

5.6.8.1. Purpose

To define the scope and SOPs for online assessment and to guide regarding conducting online formative and summative assessments under exceptional circumstances.

5.6.8.2. Scope

- The policy applies to online classes under exceptional circumstances, as announced by the university in view of the COVID-19 pandemic and any other such extraordinary, extenuating circumstances. To be held only under extraordinary circumstances by the order of the Principal.
- This policy applies to all undergraduate students enrolled in the BDS program at Dental College, HITEC-IMS.

5.6.8.3. Procedures

- The Principal Dental College, HITEC-IMS, is the Competent Authority to implement the online assessment policy.
- The HoDs of each department will be responsible for conducting formative and summative assessments throughout the online teaching period.
- Student progress will be monitored through modalities decided by the relevant faculty members and will include, but is not limited to, assignments, quizzes, open-book exams, MCQs, SEQs/SAQs and projects.
- Summative assessment will occur through a live, monitored online examination conducted by the individual departments.

5.6.8.4. Online Assessment Regulations

- The academic calendar will be modified for online teaching sessions, and the proposed exam dates will be mentioned accordingly.
- The IT department will arrange student IDs and login information and convey this to students at least 3-5 days before the exam, with a helpline number for the day of the exam to address any technical issues.
- The HoD of each department will be responsible for formulating examination questions 1 week in advance, in accordance with their modified online academic calendars.

- All candidates appearing for the examination will verify their identity via webcam before the start of the examination.
- The candidate's test environment will be quiet, and no other people will be present in the room during the exam.
- The candidate will show a view of their room, with their laptop webcam and mobile camera, both at 90 degrees to their laptop, showing their computer table/desk on which the laptop is placed.
- On the table/desk, there will be nothing except a computer and an external web camera in case the computer does not have an internal webcam. All other materials will be removed unless explicitly permitted (e.g. books allowed during open-book examination).
- There will be no sounds from music, television, or any other source. No other computers or similar devices will be running in the examination room.
- The lighting in the examination room must be of "daylight" quality.
- During the examination, the candidate will not communicate/speak with anyone.
- The candidate must not leave the room after starting the examination and must face the computer screen throughout.
- The candidate will remain under faculty observation throughout the exam.
- The video of the candidate during the online examination will be recorded and held by the dental education department as evidence of examination integrity and fairness.

5.6.9. ASSESSMENT MONITORING

- The curriculum committee monitors module, course, and assessment methods annually to ensure students receive sufficient performance feedback.
- Non-compliance is reported to the Principal via the Vice Principal of the Dental College, HITEC-IMS.

5.6.10. STRUCTURED OSPE/ OSCE

a) An OSPE/OSCE examination should include a minimum of 12 stations, of which at least four should be observed stations.

b) All observed stations should include a clinical scenario/vignette and should require the student to perform a skilful task.

c) The OSPE/OSCE stations should be structured, and they should include the following components:
- Type of station: observed/unobserved.
- Theme (Topic/Sign/Symptom/Investigation/Diagnosis).
- Clinical scenario/ vignette.
- The task to be performed by the student.
- Required items for that station, including lab items and simulated patients.
- Structured key.

d) The objective of observed OSPE/OSCE stations is to measure attitude and skill, along with the examinee's knowledge. In that regard, observed stations that involve simulated patient interaction should include the attitude component in their structured key and allocate marks to it.

5.6.11. STRUCTURED CASE-BASED LEARNING (CBL)

a) Case-Based Learning (CBL) is to be utilised by all years of the BDS program to orient the students and provide them with the clinical relevance necessary to retain basic sciences knowledge.

b) A structured CBL may have the following components:

- Topic (e.g., Temporomandibular Joint)
- Topic Placement In Curriculum (e.g., Oral Medicine, 1st/2nd /3rd block)
- Selected Theme, which would be the presenting complaint of the patient. e.g., TMJ dislocation along with limited mouth opening.
- Learning Objectives
- Clinical Scenario/Vignette
- Discussion Questions
- Multimedia Supporting Resources, including but not limited to clinical/intra-oral pictures, radiographs, and videos.
- Learning Resources, including but not limited to university-recommended textbooks, reference books, and relevant journal articles.

5.6.12. ASSESSMENT PRE, PER & POST HOC ANALYSES

5.6.12.1. ASSESSMENT PRE-HOC ANALYSIS SOPs

- The submission must be made 1 week before the scheduled examination date.
- The submission must be made in Word document format and emailed to dental.eucation@hitec-ims.edu.pk.
- Any submission by any other channel (e.g. WhatsApp) shall not be entertained.

5.6.12.2. Guidelines For Quality Stem & Lead-In Statement Construction

- Each item should focus on an important concept or phenomenon as described in the ToS. Exam items and methods should be aligned with instructional objectives.
- The sample of items used in the assessment should be representative of the learning objectives.
- Most items should assess knowledge application rather than recall isolated facts.
- The MCQ item stem lead-in statement should be closed-ended and focused; i.e., it should be phrased as a question with a question mark at the end. ‘Complete the sentence’ type MCQ items are not recommended.
- Application-level MCQs must include a lead-in statement. The lead-in statement should be closed and focused, i.e., phrased like a question.
- Stem, lead-in statement and distractor text must be clear and unambiguous:
  - Avoid imprecise phrases such as “***is associated with***”, “***is useful for***”, and “***is important***”.
  - Avoid words that provide cueing, such as “***may***” or “***could be***”.
  - Avoid vague terms such as “***usually***” or “***frequently***.”
  - Refrain from the use of words “***not***”, “***except***”, “***all of the above***”, “***none of the above***”, or “***which option is true/false***”.

- The stem should follow the "*cover test,"* i.e., the MCQ item can be answered without reading the response options.
  - Most students should be able to answer the MCQ item with all the options covered. For this, the question stem must include enough information for the student to identify the answer comfortably.
  - When developing MCQ items, checking whether the options and the attempted answer follow this rule is an excellent way to ensure it has been followed.
- The context (clinical vignette/scenario) should add value to the MCQ item stem and should not be overly long, overly complicated, or deliberately tricky to understand.
- The stem should not contain ambiguous, difficult-to-understand English words, unnecessary information, abbreviations, or technical jargon.
- The use of open-ended "fill-in-the-blank" MCQ items that are not phrased as questions with a question mark at the end is unacceptable.

5.6.12.3. Guidelines For Quality Distractors Construction

- Distractors must be clearly worded, relevant (with no odd one-out distractor), and of similar length (in the number of words).
- Distractors should be homogenous and plausible regarding their content, measuring only one dimension (measuring only one subtheme: diagnosis, investigations, management)
- Data presentation should be homogenous (e.g., all response options are either in percentages or ranges, not both)
- Avoid using informative statements, such as definitions, in the distractors.
- Avoid using redundant phrases in distractors.
- The maximum length of distractors may be limited to 10 words.
- Distractors must be mutually exclusive, and repetition of phrases/items (convergence) should be avoided.
- Distractors may be arranged in ascending order of length (w.r.t word count) with the shortest option at the top and the longest at the bottom.

5.6.12.4. Technical Flaws to Be Avoided

The majority of the technical flaws in MCQ items development belong to two main categories:

- Flaws related to irrelevant difficulty.
- Flaws related to test-wiseness.

5.6.12.5. Guidelines to Avoid Flaws Related to Irrelevant Difficulty

- MCQ item stem, lead-in statement, and distractors must not be overly complicated, difficult, or too long.
- The number of words in each option increases the cognitive load, shifting the construct being measured from content knowledge to reading speed, which is not the purpose of the assessment.
- The stem and distractors should not contain redundant, extraneous information that is not required to reach the answer to the MCQ question.
- Numeric data must be presented consistently; e.g., it should be presented in ascending order.

- All distractors should contain only one numeric data format, such as ranges, percentages, and greater/lesser than values, and must not have a mixture of them.
- Vague frequency terms such as “often”, “usually”, and “frequently” because they are subjective terms, and they are not consistently defined or interpreted by the readers, and sometimes not even by experts.
- Negatively worded statements containing “***not***” or “***except***” must be avoided.

5.6.12.6. Guidelines to Avoid Flaws Related to Test-Wiseness

- Avoid providing grammatical cues, e.g., when an option does not follow grammatically from the stem or the lead-in statement.
  - This technical flaw occurs when the MCQ author focuses more attention on writing the correct answer than on the distractors, leading to the potential for grammatical errors.
  - To avoid this flaw, read each option immediately following the stem to ensure the language fits well. Another way to prevent the flaw is always to use closed lead-ins, which help the item writer avoid it.
- Avoid grouped or collectively exhaustive distractors; e.g., only one condition can be valid for the concentration of any given substance or the severity of a disease, so it can either increase, decrease, or remain unchanged. Furthermore, all three options should not be offered as distractors, as the other two become obvious non-functional distractors.
- This flaw occurs because the MCQ item authors want a total of 4 options, but adding options that lack merit does not improve the item. Instead, the author should be able to rank order each option on the same dimension, and no subset of distractors should include all possible outcomes.
- The use of absolute terms such as “always”, “never”, and “frequently” should be avoided in the stem, lead-in statement and distractor text.
- The correct ‘key’ option should not be the most extended and detailed, joining several phrases with “and”, while the other distractors are simple, straightforward, and short in comparison.
- The presence of word repetition or similar-sounding words (also known as “clang clues”) in stem/lead-in statements and distractors should be avoided. E.g., the word “unreal” used in the stem is similar to the correct answer “*derealisation*”.
- The same flaw occurs if a word is repeated only in a metaphorical sense, such as when a stem mentions bone pain and the correct answer begins with the prefix “osteo-”
  - The MCQ author should scan the options and item stem to check for such word or phrase repetition.
- Distractors consisting of a list of items with minor differences are known as “***convergence***” phenomena. The underlying flaw is that the correct answer is the option with the most in common with the other options, and thus, the test-wise student can converge on the correct answer just by counting the number of times specific terms appear.
  - This flaw can also occur without being directly reflected in the language. If an item asks which pharmacotherapy is most effective, and three of the five options are in one class of drugs, the savvy student may rule out the other two as less likely response options. An NSAID would be an odd-one-out option among three cephalosporin drug options.

  - This flaw occurs when item writers start with the correct answer and write the distractors as permutations of it. The correct answer will likely share elements with the other options, and the incorrect answers will likely be outliers.
  - This technical flaw can be avoided by reviewing all options and checking whether words or terms are repeated across them.
- Avoid the case where a comprehensive vignette is described but is unnecessary to the question posed by the lead-in statement.
  - Often, a complex vignette thoroughly describes a condition, disease, or diagnosis, but it is followed by a question that requires no reference to the vignette's information, only superficial knowledge of the condition.

5.6.12.7. DESCRIPTIVE ESSAY QUESTIONS ANALYSIS

- Short Answer Questions (SAQs) shall also be validated during the pre-hoc analysis.
- Short Answer Questions (SAQs) are closed-ended questions requiring students to construct responses.
  - All SAQs shall be of application level of Bloom's Taxonomy, most of them including a clinical vignette, as per NUMS university policy.
- The SAQ item stem should ideally start with an action verb appropriate to the level of Bloom's Taxonomy.
- The SAQ item stem and lead-in statement must not be overly complicated, difficult, or too long (no more than five lines long, at the maximum).
- The number of words per line increases cognitive load, shifting the construct being measured from content knowledge to reading speed, which is not the purpose of the assessment.
- The SAQ/SEQ item stem should not contain lengthy, redundant, or extraneous information not required to answer the SAQ question.
  - The SAQ should not be so long and complex that "and" is used to join different parts in the same question. The question should be split into multiple sub-parts whenever the use of "and" is needed.
- The answer key for SAQs should be concise and to the point and should not be excessively long (no more than 2-3 lines long, at the maximum).
  - The answer key should include a marks distribution that justifies the allocation of marks to the level of detail and complexity required from the examinee.
- Pure recall of simple facts and figures is best assessed with multiple-choice questions; SAQs should not be used for that purpose.
- One SAQ question or its subparts should not have more than one action verb. If that is the case, it should be divided into two sub-parts.

5.6.12.8. Criteria For Content Validity Analysis

The number of MCQs from each topic will be compared with the requisite number in the relevant discipline's curriculum's Table of Specifications (ToS).

5.6.12.9. Assessment Pre-Hoc Item Analysis Report Generation

After a Pre-Hoc item analysis meeting with the relevant subject specialist, the dental education department will generate an academic event report on the

following pattern. Its submission to the exam cell is required as evidence of pre-hoc quality assurance of the MCQ assessment, as per the exam cell SOPs.

5.6.12.2. ASSESSMENT PER-HOC ANALYSIS SOPs

- Feedback on the exam's conduct would be obtained from all relevant stakeholders, including students and relevant faculty.
- This multisource input will help the dental education department and the college administration develop a comprehensive understanding of the practical, on-the-ground aspects of examination conduct and the environment's conduciveness to the examination.
- Two 5-point Likert-scale questionnaires have been developed, targeting students and faculty members.
- All students appearing in the examination will complete the per-hoc questionnaire, and no student will be allowed to leave the examination venue without completing it.
- All invigilators at the examination venue and the exam superintendent will provide their valuable feedback through the questionnaire designed for the faculty.

5.6.12.3. ASSESSMENT POST-HOC ANALYSES SOP

5.6.12.3.1. Distractor Analysis

- Any distractor chosen by 5% or less of the total number of students appearing in the examination is considered a non-functional distractor.
- An MCQ item with no non-functional distractors has a distractor efficiency of 100%. However, a single non-functional distractor has a distractor efficiency of 66%; two have 33%; and three have 0%.
- The relevant department must revise all non-functional distractors in all MCQs.

5.6.12.3.2. Difficulty Index

- The difficulty index is calculated by dividing the total number of correct responses by the total number of students appearing in the examination.
- Its value ranges from 0 to 100. The higher the value, the easier the MCQ item.

Cut-off Value	Grading	Interpretation/ Recommendation
100	Too Easy	The MCQ item is too easy and must be removed from the questionnaire.
70 – 90	Easy	Some items should be easy enough to be answered by most of the class.
30 – 70	**Excellent**	**Items in this mid-range difficulty are more likely to demonstrate adequate discrimination of students' knowledge.**

29 – 20	Moderate	Some questions are desirable to be in this range.
< 20	Too Difficult	This value indicates a severe problem with the question item or teaching.

Table 1: Difficulty Index Interpretation

5.6.12.3.3. Discriminatory Index

- The discriminatory index is calculated by subtracting the scores of the upper 27% of students from those of the lower 27% and dividing the result by the group size of 27%.
- Its value ranges from -1 to 1. The higher the value, the more the MCQ item discriminates between high- and low-performing students.
- The discriminatory index can be improved by revising the non-functional distractors from MCQ items.

Cut-off Value	Grading	Interpretation	Recommendation
0.40 or Above	Excellent	Reflects quality MCQ item construction and teaching.	Definitely keep it in the MCQ bank.
0.30 – 0.39	**Good**	**Good discrimination by the MCQ item.**	**Keep in the MCQ bank.**
0.20 – 0.29	Fair	Adequate discrimination by the MCQ item.	Maybe keep it in the MCQ bank.
< 0.20	Poor	Insignificant discrimination.	Check the key for correctness; if correct, discard the MCQ item.
< 0	Negative Discrimination	Low-scoring students are performing well on this MCQ item, which is unacceptable.	Definitely discard the MCQ item.

Table 2: Discriminatory Index Interpretation

5.6.12.3.4. Reliability/ Internal Consistency

- The reliability/internal consistency of the MCQ questionnaire is assessed using the Kuder-Richardson 20 (KR-20) Index.
- Its value ranges between 0 to 1. The minimum required value is 0.8; otherwise, the questionnaire is not considered reliable.

- A value of 1.0 indicates redundancy in the questionnaire; multiple MCQ items measure the same construct/question, so those repetitive MCQ items must be eliminated.
- A negative/poor value (<0.8) of KR-20 indicates:
  - The low number of MCQ items.
  - Poor distractor efficiency.
  - Negatively worded, true/false MCQ lead-in statements.
  - High standard deviation value.
  - Inferior internal consistency of the questionnaire.
- Reliability can be improved by:
  - Non-functional distractors in MCQ items should be revised.
  - MCQ items with negative discriminatory index values should be deleted from the questionnaire, and MCQ items with poor discriminatory index values should be revised.
  - The practice of using true/false and negative statements in MCQ items containing "***not***" and "***except***" should not be used.

Cut-off Value	Grading	Interpretation/ Recommendation
< 0	Deplorable	Absolutely unacceptable.
0.0 – 0.79	Poor	Conditional acceptance based upon no. of MCQ Items.
0.80 – 0.89	**Good**	**Reflects quality MCQ item construction.**
0.90 – 0.99	Excellent	Reflects high-quality MCQ item construction.
1	Poor	Multiple redundant items are measuring the same construct.

Table 3: Questionnaire Reliability Interpretation

5.6.12.3.5. MCQ Bank Criteria For Examination Items Revision

The examination items with the following parameters will be recommended for revision by the relevant subject specialist faculty:

- 0% of students chose any distractor.
- 2 or more non-functional distractors.
- Any distractor chosen more than the key option.
- Regarding Difficulty Index (DIF):
  - 90% or more DIF indicates a very difficult question, which, if the question is not a universal must-know truth, should be revised.
  - A DIF of 20% or less indicates a very difficult question and should be revised.
- Regarding the Discriminatory Index (DI):
  - Examinations with a DI between 0.1 and 2.4 are recommended for revision.

5.6.12.3.6. MCQ Bank Criteria For Examination Items Replacement

The examination items with the following parameters will be recommended for replacement from the questionnaire, and they shall not be utilised in any future examinations.

- MCQ items justifiable by the subject specialist's expert opinion (i.e. must know definitions, etc.) shall not be classified as requiring replacement.
- Examination items with three non-functional distractors.
- Examination items with three distractors chosen more than the key option.
- Regarding Difficulty Index (DIF), examination items with 100% (Very Easy) & 0% (Very Difficult) correct answer frequency.
- Regarding the Discriminatory Index (DI), examination items with a zero or negative discrimination index value.

5.6.12.3.7. Mechanism of Examination Result Modification Based on Post-Hoc Item Analysis

- All concerned departments will upload their MCQ key to NOMES by the day of the last theory examination, or the day after it at the latest.
- The NOMES Coordinator at the Exam Cell will provide DDE with the post-hoc item analysis statistical reports, which DDE will provide to the concerned departments.
- The departments will perform post-hoc analysis for their respective disciplines and submit the modifications, or the justification that the modification is not required, to the exam cell via a formal letter.
- For each post-hoc item deletion, the students will be granted 1 grace mark.
- The exam cell will modify examination results as per modifications communicated by the respective departments and will announce the modified results to students.
- The exam cell will provide both the initial examination result before post-hoc modifications and the modified result after post-hoc analyses as evidence of compliance with the PM&DC requirements.
- If the post-hoc analysis is not provided to the dental education department by the exam cell within 5 working days, due to any extenuating circumstances, the EoB result will not be withheld and announced to students without post-hoc modification.

5.6.12.3.8. Criteria For Examination Result Modification

- Regarding the Discriminatory Index (DI), examination items with a zero or negative discrimination index value will be deleted.