

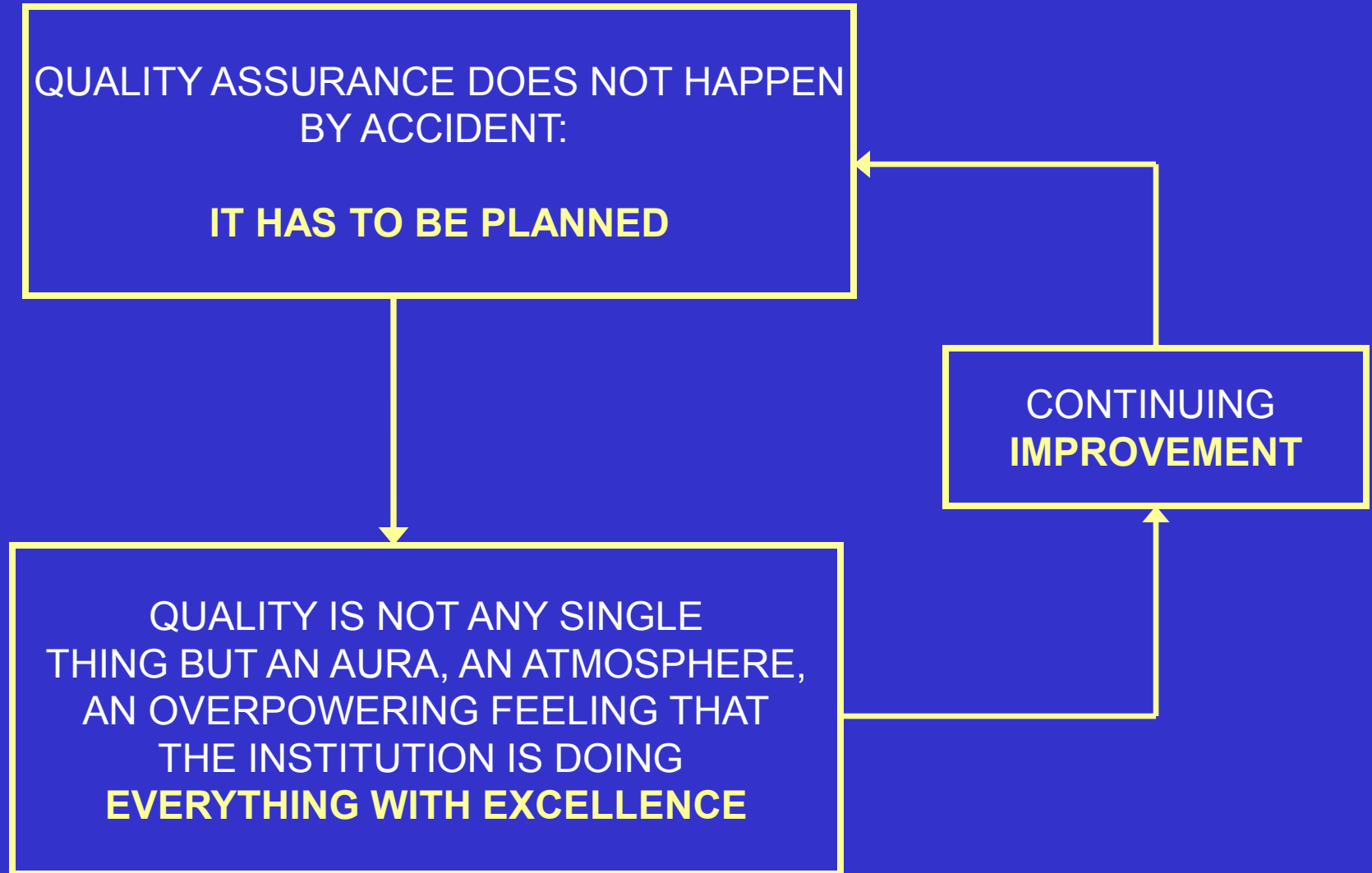
SELF-ASSESSMENT PROCEDURES FOR UNIVERSITY PROGRAM

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Director Quality Assurance, (NUST)
19 August, 2006

PRESENTATION PLAN

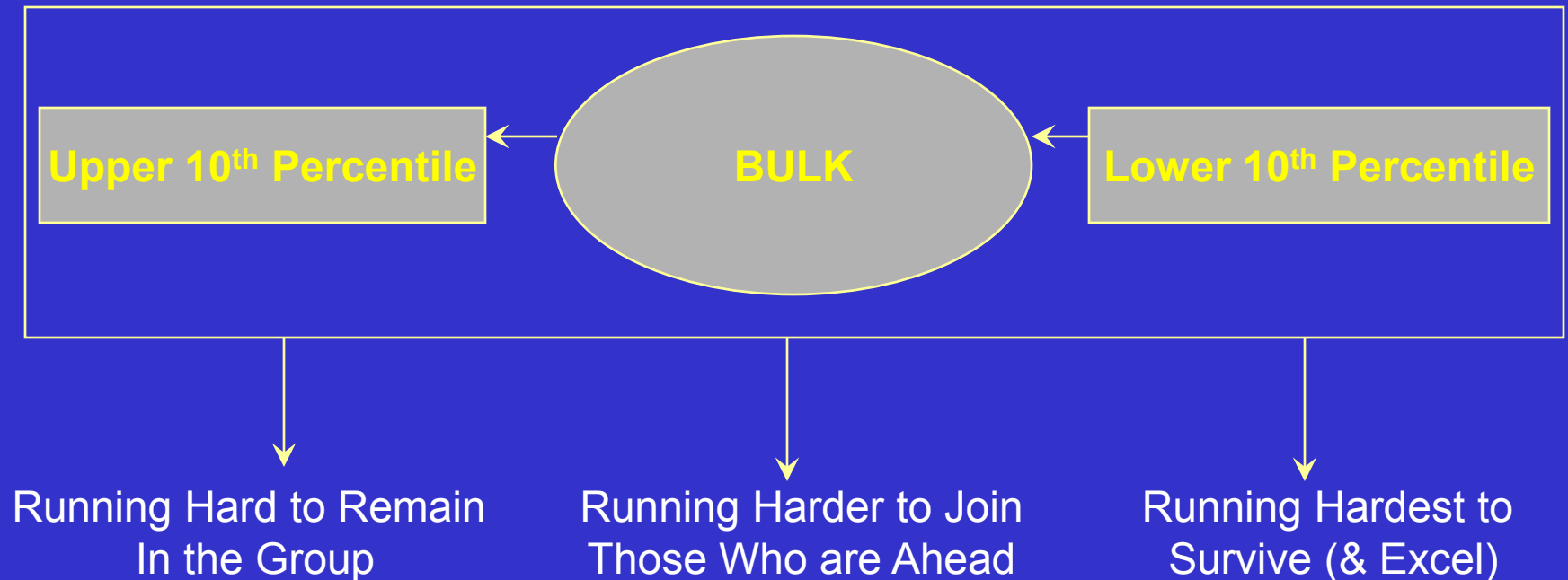
- Introduction
- Quality Assurance Need & its Improvement
- QEC Functions and Organization
- Self-Assessment:
 - Definitions, Elements, Desired Outcomes, Requirement, Current practice, Objectives, Model, Components
- Self-Assessment Procedure
- Closing remarks

QUALITY ASSURANCE NEED



CONTINUOUS IMPROVEMENT OF QUALITY

- Grouping of Organizations



- Means Running to be Stationary

IMPROVEMENT THROUGH QUALITY MANAGEMENT

Models of Excellence

Accreditation

- ABET, PEC, Education QA Agencies (e.g. QAA, UK)

Performance Excellence Criteria

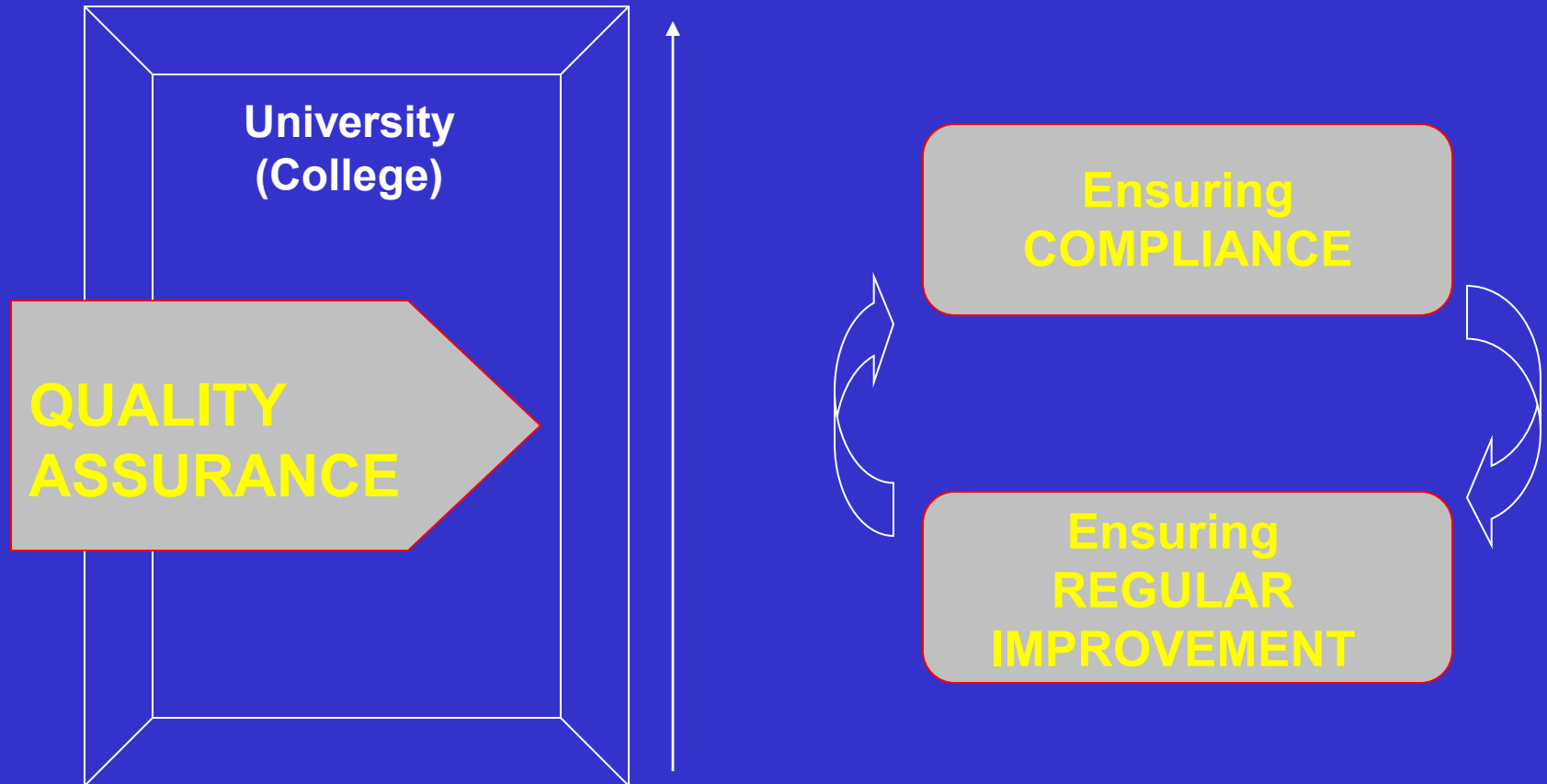
- National Quality Award Criteria for Educational excellence (e.g. BALDRIGE)
- Excellence Model to Improve Performance (e.g. European Foundation for Quality Management - EFQM)

Standards

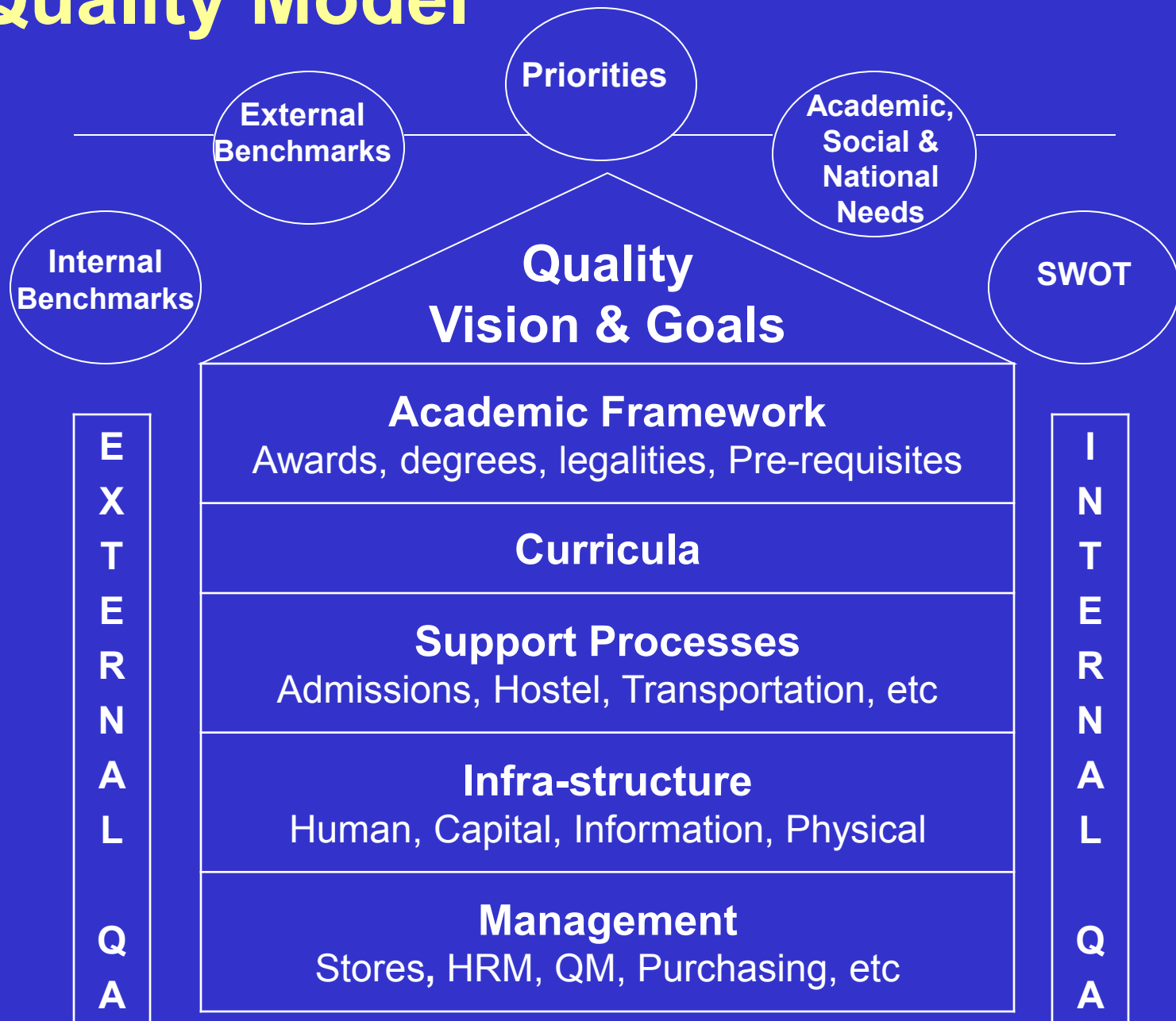
- ISO QMS (With Education Guidelines)

. Basis for all these systems is Self Assessment.

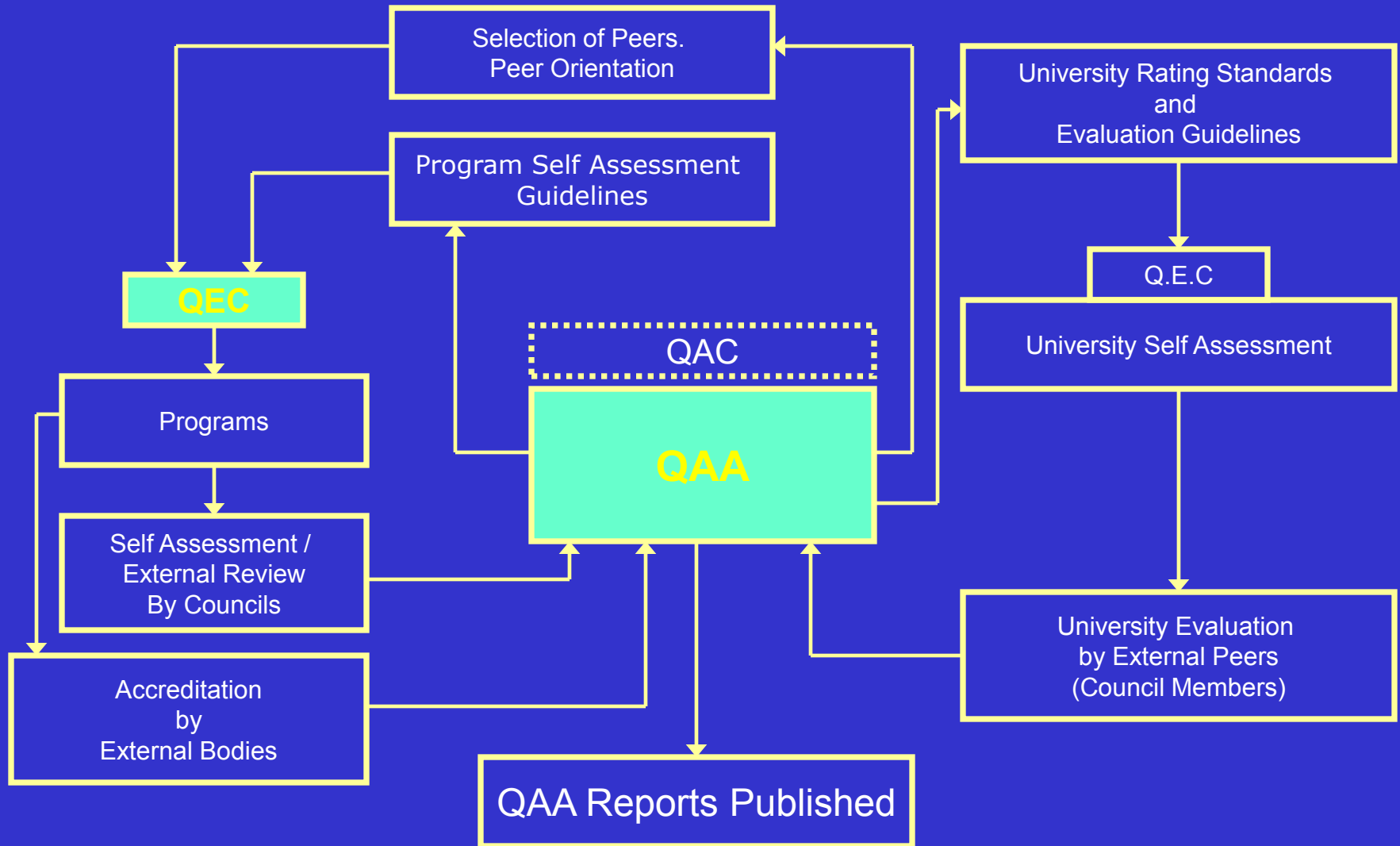
OUTPUT OF QUALITY ASSURANCE



Quality Model





QA OPERATIONS: AN OUTLINE



QEC FUNCTIONS

- The Quality Enhancement Cell (QEC) is to be headed by a Dean reporting directly to Vice Chancellor/Rector. He is to be the correspondent with the outside bodies.
- **QEC is Responsible For:**
- Promoting public confidence that the quality and standards of the award of degrees are enhanced and safeguarded.
- Review of quality standards and the quality of teaching and learning in each subject area.
- Review of academic affiliations with other institutions in terms of effective management of standards and quality of programs.
- Defining clear and explicit standards as points of reference to the reviews to be carried out. It should also help the employer to know as to what they could expect from candidates.

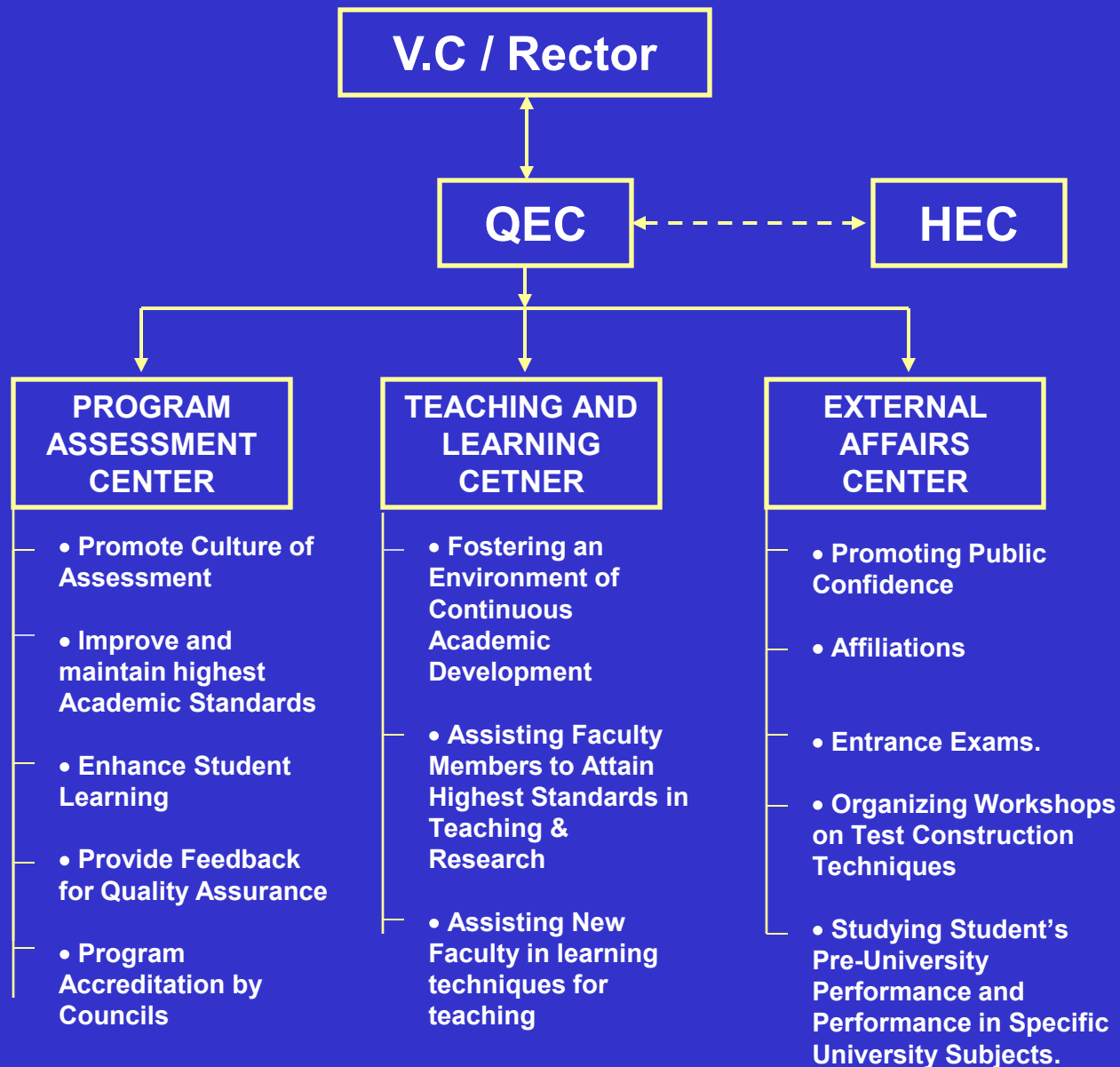
QEC FUNCTIONS

- Developing qualifications framework by setting out the attributes and abilities that can be expected from the holder of a qualification, i.e. Bachelors, Bachelor with Honors, Master's, M. Phil., Doctoral.
- Developing program specifications. These are standard set of information clarifying what knowledge, understanding, skills and other attributes a student will have developed on successfully completing a specific program. 
- Developing quality assurance processes and methods of evaluation to affirm that the quality of provision and the standard of awards are being maintained and to foster curriculum, subject and staff development, together with research and other scholarly activities. 

QEC FUNCTIONS

- Ensuring that the university's quality assurance procedures are designed to fit in with the arrangements in place nationally for maintaining and improving the quality of Higher Education.
- QEC is responsible to develop procedures for the following:
 - Approval of new programs
 - Annual monitoring and evaluation including program monitoring, faculty monitoring, and student's perception.
 - Departmental review
 - Feedback (Student, Faculty, Alumni, Employer)
 - Quality assurance of Master's, M. Phil. And Ph. D. degree programs.
 - Subject review
 - Institutional assessment
 - Program specifications
 - Qualification framework

QEC ORGANIZATIONS : A MODEL



ASSESSMENT OF A PROGRAM

- Assessment is a systematic process of gathering, reviewing and using important quantitative and qualitative data and information from multiple and diverse sources about educational programs, for the purpose of improving student learning, and evaluating whether academic and learning standards are being met.

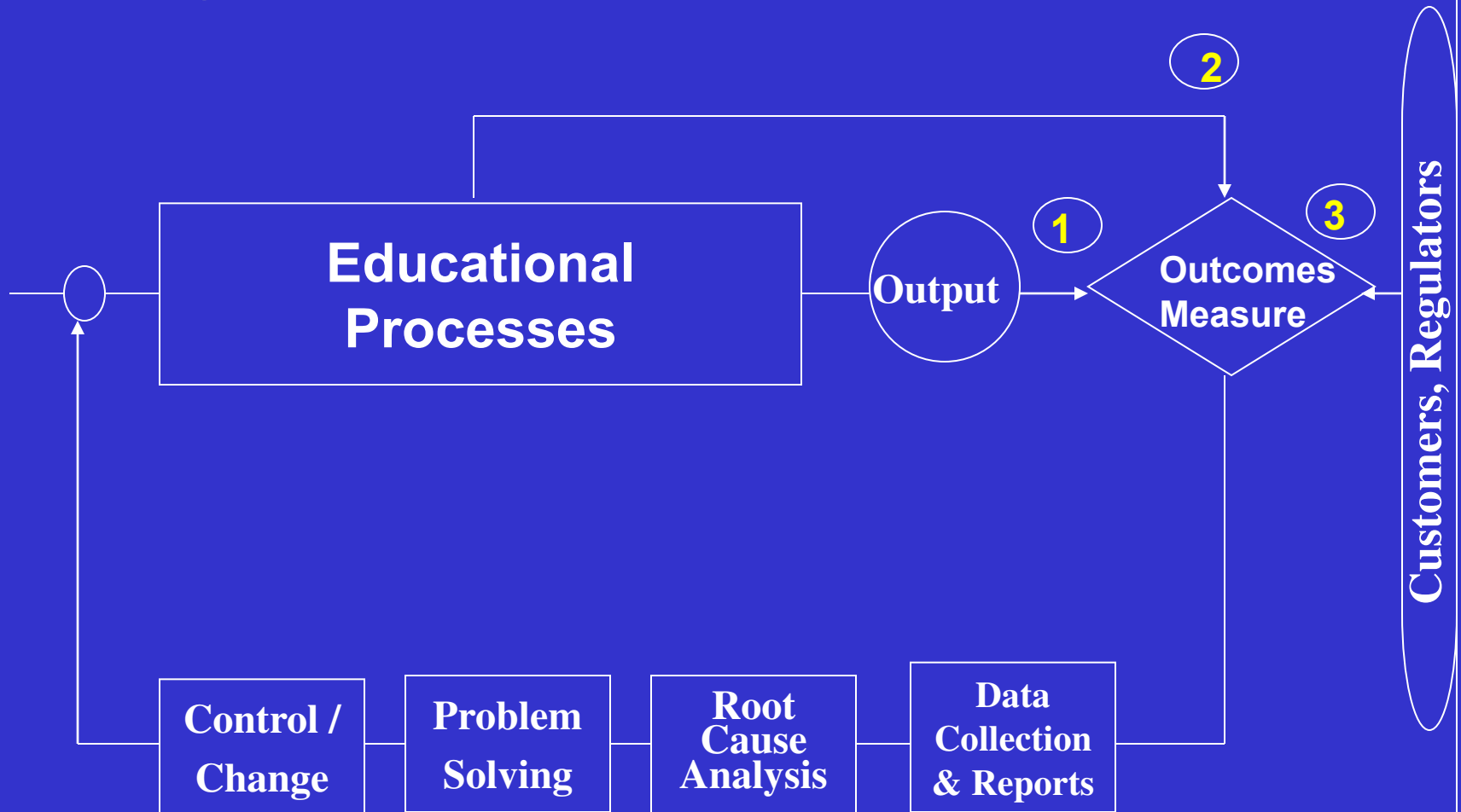
SELF-ASSESSMENT

- Self assessment is an assessment conducted by the institution to assess whether programs meet their educational objectives and outcomes with the purpose to improve program's quality and enhancing students learning.

ELEMENTS OF ASSESSMENT

- Purpose identification
- Outcomes identification
- Measurements and evaluation design
- Data collection
- Analysis and evaluation
- Decision-making regarding actions to be taken.

Quality Assurance Conceptual Model



DESIRED OUTCOMES OF SELF ASSESSMENT

- To be proactive than reactive.
- Systematize the process of assessment.
- To be current and take a leadership role in the country.
- Assist in preparing good professionals of tomorrow.
- Initiate improvements to achieve academic excellence.

ACCREDITATION BODIES REQUIRING SELF ASSESSMENT

- Accreditation Board of Engineering & Technology (ABET)
- Association to Advance Collegiate Schools of Business (AACSB)
- Computer Science Accreditation Board (CSAB)

The core requirement of all these bodies is Self-Assessment of Programs by Institutions

- PEC & PMDC for Accrediting Engineering and Medical Education in Pakistan (PEC Form AC-1)

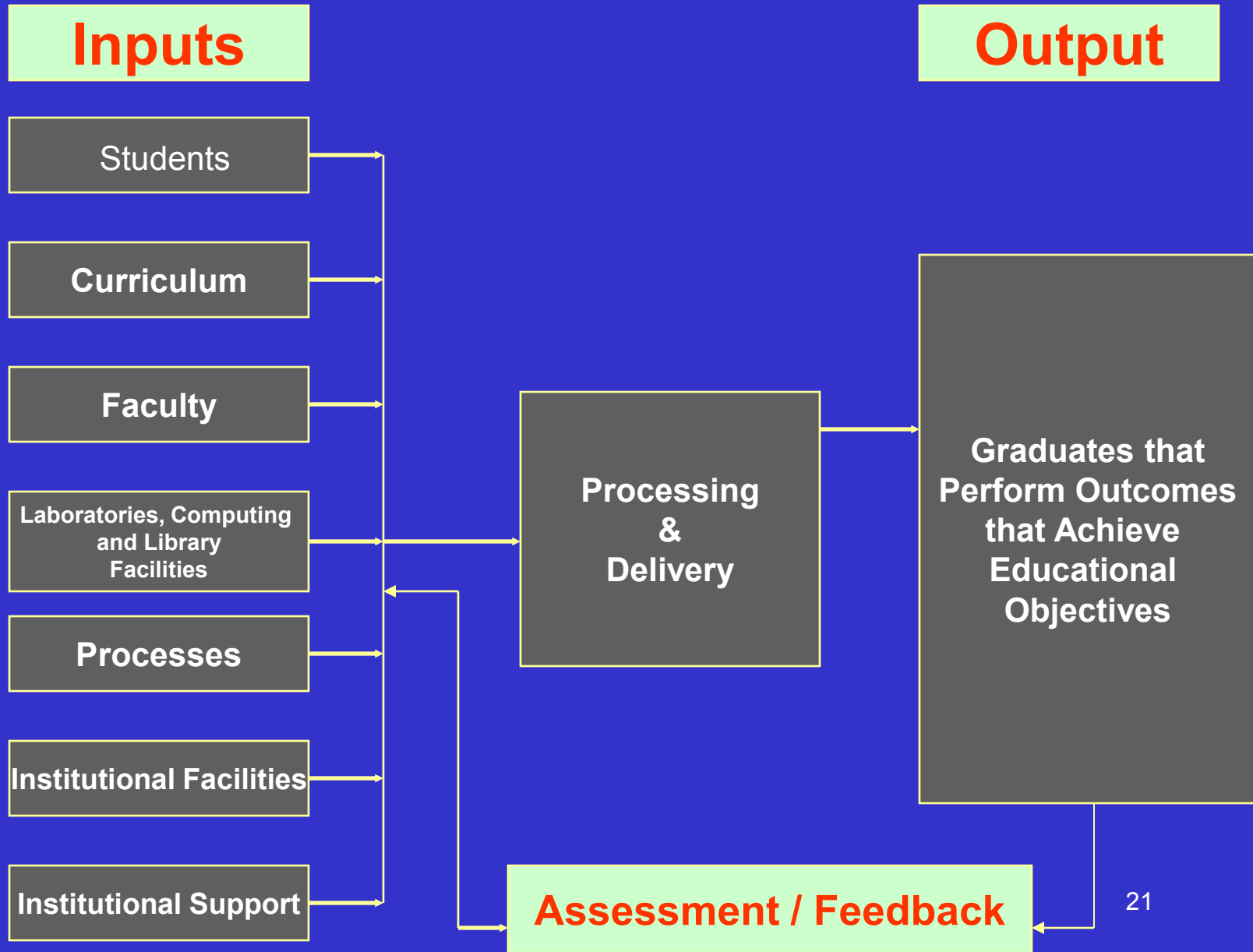
CURRENT PRACTICE (WHO IS DOING IT?)

- 94 percent of institutions in the US had assessment activities under way
- 90 percent had increased their activities compared to five years ago.
- Rather than depending on nationally available assessment instruments, most institutions (86 percent) reported using local measures, and
 - Nearly 70 percent were developing their own portfolios.
- Universities included: MIT, University of Michigan, University of Illinois at Urbana, University of Wisconsin at Madison, Texas A & M University, University of Texas at Austin, Purdue University, University of Tennessee, Knoxville, Al Ain University at UAE, King Fahd University of Petroleum and Minerals, Dhahran and many others.

OBJECTIVES OF SELF ASSESSMENT

- **Verify that the existing programs meet their objectives and institutional goals.**
- **Provide feedback for quality assurance of academic programs.**
- **Improve and maintain academic standards**
- **Enhance students' learning.**

ASSESSMENT MODEL



COMPONENTS OF THE SELF-ASSESSMENT PROCESS

- **CRITERIA** : EIGHT CRITERIA FOR SELF ASSESSMENT.
- **PROCEDURE**: SPECIFIES THE PROCESS OF INITIATING, CONDUCTING, AND IMPLEMENTING THE ASSESSMENT.

CRITERIA

- **EACH CRITERION HAS:**
 - **AN INTENT:** A STATEMENT OF REQUIREMENTS TO BE MET.
 - **SEVERAL STANDARDS:** THEY DESCRIBE HOW THE INTENTS ARE MINIMALLY MET

CRITERIA AND STANDARDS

Crit No.	Description	No. of Stds
1	PROGRAM MISSION, OBJECTIVES AND OUTCOMES	4
2	CURRICULUM DESIGN AND ORGANIZATION	7
3	LABORATORIES AND COMPUTING FACILITIES	3
4	STUDENT SUPPORT AND GUIDANCE	3
5	PROCESS CONTROL	5
6	FACULTY	3
7	INSTITUTIONAL FACILITIES	3
8	INSTITUTIONAL SUPPORT	3

SELF-ASSESSMENT PROCEDURE

The QEC is responsible for planning, coordinating and following up on the self-assessment (SA) activities. The steps of the procedure for SA are as follows:

- The QEC initiates the SA one semester prior to the end of the assessment cycle through the Office of Head of the Institution in which the program is offered. However, if the program is undergoing the SA for the first time, the department will be given one academic year for preparation.
- Upon receiving the initiation letter the department shall form a program team (PT). The PT will be responsible for preparing a self-assessment report (SAR) about the program under consideration *over a period of one semester*. They will be the contact group during the assessment period.

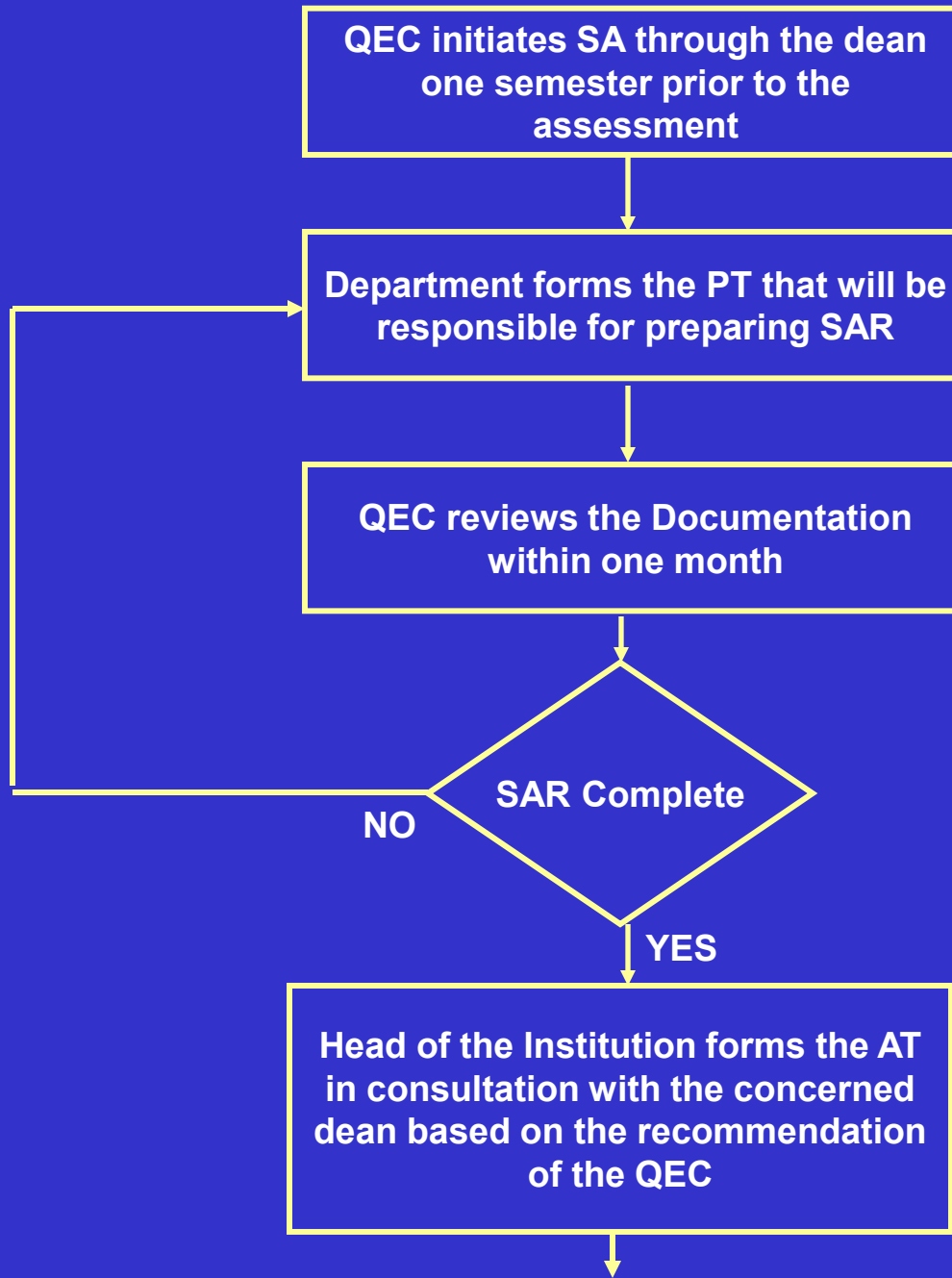
SELF-ASSESSMENT PROCEDURE

- The department shall submit the SAR to the QEC through the concerned Dean. The QEC reviews the SAR *within one month* to ensure that it is prepared according to the required format.
- Head of the Institution forms a program assessment team (AT) in consultation with the QEC recommendations *within one month*. The AT comprises of 2-3 faculty members from within or outside the institution. The AT must have at least one expert in the area of the assessed program.
- The QEC plans and schedules the AT visit period in coordination with the department that is offering the program.
- The AT conducts the assessment, submits a report and presents its findings in a meeting that shall be attended by the QEC, Dean and PT and faculty members.

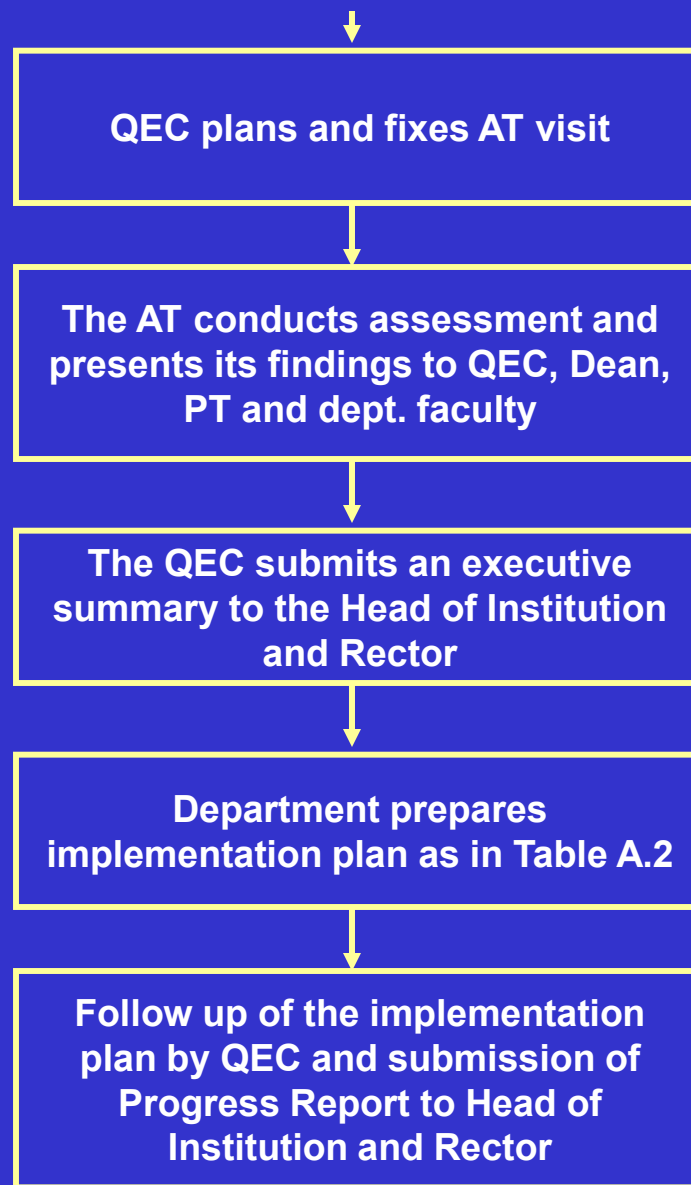
SELF-ASSESSMENT PROCEDURE

- The QEC shall submit an executive summary on the AT findings to the Head of the institution with a copy to Dir QA NUST for the perusal of the Rector.
- The Department shall prepare and submit an implementation plan to QEC based on the AT findings. The plan must include AT findings and the corrective actions to be taken, assignment of responsibility and a time frame for such actions. Table A.2 provides a format for preparing a summary of the implementation plan.
- The QEC shall follow up on the implementation plan to ensure departments are adhering to the implementation plan. The academic department shall inform the QEC each time a corrective action is implemented. QEC shall review the implementation plan once a semester to assess the progress of implementation and prepare a 'Progress Report' for the perusal of Head of Institution / Rector. Table A.2 will provide the QEC with guidelines for monitoring the implementation.

SELF-ASSESSMENT PROCEDURE



SELF-ASSESSMENT PROCEDURE



Legend:

QEC: Quality Assurance Committee

SAR: Self Assessment Report

SA: Self Assessment

PT: Program Team

ASSESSMENT RESULTS IMPLEMENTATION PLAN SUMMARY

AT Finding	Corrective Action	Implementation Date	Responsible Body	Resources Needed
1				
2				
3				
4				
5				
6				
7				
8				

Chairman and Dean's comments with name and signature:

QEC comments with name and signature:

CRITERION 1

PROGRAM MISSION, OBJECTIVES AND OUTCOMES

- EACH PROGRAM MUST HAVE A MISSION, MEASURABLE OBJECTIVES AND EXPECTED OUTCOMES FOR GRADUATES.
- OUTCOMES INCLUDE COMPETENCY AND TASKS GRADUATES ARE EXPECTED TO PERFORM AFTER COMPLETING THE PROGRAM.
- A STRATEGIC PLAN MUST BE IN PLACE TO ACHIEVE THE PROGRAM OBJECTIVES.
- THE EXTENT TO WHICH THESE OBJECTIVES ARE ACHIEVED THROUGH CONTINUOUS ASSESSMENT AND IMPROVEMENTS MUST BE DEMONSTRATED.

Standard 1-1

The program must have documented measurable objectives that support college / institution mission statements:

MEETING STANDARD 1-1

- Document institution, departmental and program mission statements.
- State program objectives.
- Describe how each objective is aligned with program, departmental and institution mission statements.
- Outline the main elements of the strategic plan to achieve the program mission and objectives.
- Provide for each objective how it was measured, when it was measured and improvements identified and made.

- **Document institution / college and program mission statements**

(Example: Mission Statement of University / Institute)

- To develop human resources by inculcating professional knowledge, skills and ethical values, to bring-in prosperity and technological advancement based on high-tech research in the individual's life and society at large.
- **State program objectives.** Program educational objectives are intended to be statements that describe the expected accomplishments of graduates during the first several years following graduation from the program

Example: Mission Statement of Program BS in Engineering Programs

To build concrete concepts of the subject through high quality class teaching, laboratory work and small-scale research work, to help individuals become change agents on the canvas of technology advancement and innovation.

Program Objectives:

- To enable the graduate to apply knowledge gained in the degree program effectively and efficiently.
- To successfully bring innovation in related technology with cost-effectiveness.
- To step into Research and Development (R&D) effectively.
- To pursue higher studies in any international University of high repute.
- To breakaway from maintenance-based job and step into designing and manufacturing.
- Describe how each objective is aligned with program, college and institution mission statements.

SPECIFIC OBJECTIVES

Objective 1 (Foundation):

To provide students with a strong foundation in engineering sciences and design methodologies that emphasizes the application of the fundamental mathematical, scientific and engineering principles in the areas of engineering.

Objectives 2 (Skills and Tools):

To provide students with skills to enter the workplace well-prepared in the core competencies listed below:

- Design and modeling experience
- Open-ended problem solving ability
- Experimental and data analysis techniques
- Teamwork experience
- Oral written and multimedia communication skills
- Experience with contemporary computing systems and methodology

Objectives 3 (Awareness & Professional Ethics):

To provide students with knowledge relevant to engineering practice, including ethical, professional, social and global awareness, the impact of engineering on society, the importance of continuing education and lifelong learning in both technical and non-technical areas.

- Outline the main elements of the strategic plan to achieve the program mission and objectives.

(Example: Main elements of the strategic plan to achieve program mission and objectives)

Curriculum design: Core subjects, Elective subjects. A wide variety of elective subjects are offered which brings diversity in the program.

- It also includes provision of areas of specialization.
- Concept building through extensive laboratory work, applying theoretical knowledge.
- Small-scale practical projects compatible with contemporary technological advancements throughout the degree program, and one practical Project in the final semester; which may become basis for winning a good job.
- Compulsory summer internships to give hands-on experience to students. Internships are arranged by the University.
- Co-curricular activities like academic clubs, participating in national and international competitions and exhibitions.

DEPARTMENT MISSION

STATEMENT

- The mission of the department is to serve the students of the university and the nation by providing quality education with a strong foundation in the fundamental principles of engineering; preparing students for leadership position and successful careers in industry, government, and academia; extending the knowledge base to support the competitiveness of existing industry and to spawn new economic development in the nation through active involvement in basic and applied research; and providing professional development opportunities for practicing engineers through continuing education and other outreach activities.
- The Department is committed to providing highest quality education, conducting high quality basic and applied research addressing the evolving needs of industry and society, and supporting the development of more competitive and new industry in the country.

PROGRAM LEARNING OUTCOMES

The broad educational objectives of the undergraduate program are to provide a solid foundation of mathematical, scientific and engineering knowledge and to develop the basic skills that will serve the students throughout their careers.

Degree of skills and capabilities that will reflect on their performance as engineers is their ability to:

- apply knowledge of mathematics science and fundamental engineering to mechanical engineering problems.
- identify, formulate and solve practical engineering problems.
- design components, processes and systems to meet desired needs.
- conduct engineering experiments to study different engineering systems, including various modes of operation, performance evaluation, properties of materials and manufacturing techniques, as well as to use laboratory instruments and computers to analyze and interpret data.

PROGRAM LEARNING OUTCOMES

- use modern tools, techniques, and skills necessary for practicing mechanical engineering including computational tools, statistical techniques, and instrumentation.
- work in a professional engineering environment, and to understand the associated economical considerations.
- work effectively in teams including multidisciplinary teams to solve engineering problems relevant to their field.
- communicate effectively in written, oral, and graphical forms, including the use of professional quality visual aids.
- understand the professional and ethical responsibilities of engineers.
- understand the impact of engineering on the society and the environment.
- recognize the need and an ability to engage in lifelong learning of mechanical engineering

Standard 1 - 2:

The program must have documented outcomes for graduating students. It must be demonstrated that the outcomes support the program objectives and that graduating students are capable of performing these outcomes:

- **Describe how the program outcomes support the program objectives. In Table 4.2, show the outcomes that are aligned with each objective. A sample of such a table is shown in Appendix D.**

OUTCOMES VERSES OBJECTIVES

Expected Learning Outcomes	PROGRAM OBJECTIVE			
	1	2	3	4
1				
2				
3				

Table 4.2: Outcomes versus objectives

Sample of a Matrix Relating Program Outcomes to Program Objectives

Program Learning Outcomes	Program Objectives				
	Skills in critical thinking, problem solving and communication	Initiate and manage change	Understand professional ethics and responsibility	Employ I. S. Technology	Enable organizations to make optimal decision making
	X			X	X
	X	X			
Use up to date tools				X	X
Life long learning	X		X	X	
Professional ethics and responsibility	X		X		

Sample of a Matrix Relating Program Outcomes to Program Objectives

Notes:

1. Knowledge, understanding, skills and other attributes a student is required to have developed on completing the program be included under Program Learning Outcomes.
2. Program objectives as achieved by the students on completing the program are to be shown by marking 'x'.

MEETING STANDARD 1-2

- Describe the means for assessing the extent to which graduates are performing the stated program outcomes / learning objectives:
 1. Conducting a survey of graduating seniors every semester.
 2. Conduct a survey of alumni every two years.
 3. Conduct a survey of employers every two years.
 4. Carefully designed questions asked during design projects presentations.
 5. Outcome assessment examination

SURVEY OF GRADUATING STUDENTS

(Conduct a survey of graduating seniors every semester)

The survey seeks graduating students' input on the quality of education they received in their program and the level of preparation they had at NUST.

A: Strongly Agree B: Agree C: Disagree D: Strongly Disagree

SURVEY OF GRADUATING STUDENTS

1. The work in the program is too heavy and induces a lot of pressure.

A	B	C	D
---	---	---	---

2. The program is effective in enhancing team-working abilities.

A	B	C	D
---	---	---	---

3. The program administration is effective in supporting learning.

A	B	C	D
---	---	---	---

4. The program is effective in developing analytic and problem solving skills.

A	B	C	D
---	---	---	---

5. The program is effective in developing independent thinking.

A	B	C	D
---	---	---	---

6. The program is effective in developing written communication skills.

A	B	C	D
---	---	---	---

7. The program is effective in developing planning abilities.

A	B	C	D
---	---	---	---

8. The mathematical content of the program is adequate for pursuing the advance courses in the program.

A	B	C	D
---	---	---	---

SURVEY OF GRADUATING STUDENTS

- Answer question 9 if applicable.

9. The internship experience is effective in enhancing:

(a) Ability to work in teams.

A	B	C	D
---	---	---	---

(b) Independent thinking.

A	B	C	D
---	---	---	---

(c) Appreciation of ethical Values.

A	B	C	D
---	---	---	---

(d) Professional development.

A	B	C	D
---	---	---	---

(e) Time management skills.

A	B	C	D
---	---	---	---

(f) Judgment.

A	B	C	D
---	---	---	---

(g) Discipline.

A	B	C	D
---	---	---	---

(h) The link between theory and practice.

A	B	C	D
---	---	---	---

A	B	C	D
---	---	---	---

SURVEY OF GRADUATING STUDENTS

10. What are the best aspects of your program?

11. What aspects of your program could be improved?

ALUMNI SURVEY

(Conduct a survey of alumni every two years)

The purpose of this survey is to obtain alumni input on the quality of education they received and the level of preparation they had at NUST.

A: Excellent B: Very good C: Good D: Fair E: Poor

ALUMNI SURVEY

I KNOWLEDGE

1. Math, Science and Engineering Skills	(A)	(B)	(C)	(D)	(E)
2. Problem formulation and solving skills	(A)	(B)	(C)	(D)	(E)
3. Collecting and analyzing appropriate data	(A)	(B)	(C)	(D)	(E)
4. Ability to link theory to practice	(A)	(B)	(C)	(D)	(E)
5. Ability to design a system component or process	(A)	(B)	(C)	(D)	(E)
6. Computer knowledge	(A)	(B)	(C)	(D)	(E)

II Communication Skills

1. Oral communication	(A)	(B)	(C)	(D)	(E)
2. Report writing	(A)	(B)	(C)	(D)	(E)
3. Presentation skills	(A)	(B)	(C)	(D)	(E)

ALUMNI SURVEY

III INTERPERSONAL SKILLS

1. Ability to work in teams	(A)	(B)	(C)	(D)	(E)
2. Independent thinking	(A)	(B)	(C)	(D)	(E)
3. Appreciation of ethical values	(A)	(B)	(C)	(D)	(E)
4. Professional development	(A)	(B)	(C)	(D)	(E)

IV WORK SKILLS

1. Time management skills	(A)	(B)	(C)	(D)	(E)
2. Judgment	(A)	(B)	(C)	(D)	(E)
3. Discipline	(A)	(B)	(C)	(D)	(E)

ALUMNI SURVEY

V General Comments

Please make any additional comments or suggestions, which you think would help strengthen our programs. (New courses that you would recommend and courses that you did not gain much from)

VI Alumni Information

Name (Optional): _____

Name of organization: _____

Position in organization: _____

Year of graduation: _____

EMPLOYER SURVEY

(conduct a survey of employer every two years)

- The purpose of this survey is to obtain employers' input on the quality of education NUST is providing and to assess the quality of the academic program.

A: **Excellent** B: **Very good** C: **Good** D: **Fair** E: **Poor**

EMPLOYER SURVEY

I. Knowledge						
1.	Math, Science and Engineering Skills	(A)	(B)	(C)	(D)	(E)
2.	Problem formulation and solving skills	(A)	(B)	(C)	(D)	(E)
3.	Collecting and analyzing appropriate data	(A)	(B)	(C)	(D)	(E)
4.	Ability to link theory to Practice	(A)	(B)	(C)	(D)	(E)
5.	Ability to design a system					
	component or process	(A)	(B)	(C)	(D)	(E)
6.	Computer knowledge	(A)	(B)	(C)	(D)	(E)
II. Communication Skills						
1.	Oral communication	(A)	(B)	(C)	(D)	(E)
2.	Report writing	(A)	(B)	(C)	(D)	(E)
3.	Presentation skills	(A)	(B)	(C)	(D)	(E)

EMPLOYER SURVEY

III. Interpersonal Skills						
1.	Ability to work in teams	(A)	(B)	(C)	(D)	(E)
2.	Leadership	(A)	(B)	(C)	(D)	(E)
3.	Independent thinking	(A)	(B)	(C)	(D)	(E)
4.	Motivation	(A)	(B)	(C)	(D)	(E)
5.	Reliability	(A)	(B)	(C)	(D)	(E)
6.	Appreciation of ethical values	(A)	(B)	(C)	(D)	(E)
IV. Work Skills						
1.	Time management skills	(A)	(B)	(C)	(D)	(E)
2.	Judgment	(A)	(B)	(C)	(D)	(E)
3.	Discipline	(A)	(B)	(C)	(D)	(E)

EMPLOYER SURVEY

V General Comments:

Please make any additional comments or suggestions, which you think would help strengthen our programs for the preparation of graduates who will enter your field. Did you know as to what to expect from graduates?

VI Information About Organization:

1. Organization Name
2. Type of Business
3. Number of Graduates (specify the program) in your Organization.
4. Carefully designed questions asked during senior projects presentations. These questions should be related to program outcomes.
5. Outcomes examinations.

PROGRAM OBJECTIVES ASSESSMENT

Objectives	How Measured	When Measured	Improvements Identified (Based on the Outcomes examination)	Improvements Made
1	Appendix C			
2	- Do -			
3	- Do -			
4	- Do -			
5	- Do -			

Table 4.1 Program Objectives Assessment

EXERCISE 1

Given your University's mission, please develop:

- Program Mission
- Two Program Objectives which address needs of one of your two constituencies.

University Mission:

Given.

Program Mission:

Program Objectives:

- a)
- b)

EXERCISE 2

Given the Program Objectives you developed, develop a set of measurable outcomes for each Objective:

- **Objective 1:**
- **Measurable Outcomes:**
- **Objective 2:**
- **Measurable Outcomes:**

Standard 1-3:

The results of program's assessment and the extent to which they are used to improve the program must be documented.

MEETING STANDARD 1-3

- Describe the actions taken based on the results of periodic assessments.
- Describe major future program improvements plans based on recent assessments.
- List strengths and weaknesses of the program.
- List significant future development plans for the program.

Assessment Results Implementation Plan Summary

AT Findings	Corrective Action	Implementation Date	Responsible Body	Resources Needed
1				
2				
3				

Chairman's Comments Name & Signature

Dean's Comments Name & Signature

QEC Comments Name & Signature

**Table A.2 Assessment Results Implementation Plan
Summary**

Standard 1- 4:

The Department Must Assess Its Overall Performance Periodically Using Quantifiable Measures.

- Present students enrolment (undergraduate and graduate) during the last three years indicating percentages of honor students, student faculty ratio, average graduating grade point average per semester, average time for completing the undergraduate program and attrition (drop-out) rate.
- Indicate percentage of employers that are strongly satisfied with the performance of the department's graduates (Use employer's survey).
- Indicate the median/average student evaluation for all courses and the % of faculty awarded excellence in research award.
- Present performance measures for research activities. These include journal publications, funded projects, and conference publications per faculty per year and indicate the % of faculty awarded excellence in research award.
- Present performance measures for community services. This may include number of short courses per year, workshops and seminars organized.
- Indicate faculty and students satisfaction regarding the administrative services offered by the department. Use faculty and students surveys.

CRITERION 2

CURRICULUM DESIGN & ORGANIZATION

The curriculum must be designed and organized to achieve the program's objectives and outcomes. Also course objectives must be in line with program outcomes. The breakdown of the curriculum must satisfy the standards specified in this section. Curriculum standards are specified in terms of credit hours of study.

Provide the following information about the program's curriculum:

- (A) Title of degree program.
- (B) Definition of credit hour.

CRITERION 2

C. Degree plan: attach a flow-chart showing the prerequisites, core, and elective courses.

LIST OF COE COURSES

COE Core Courses

S.N	Course	Title	Credit hours	Laboratory Hours	Total Credit Hours	Pre-Requisites
1	COE 200	Fundamental of Computer Engineering	3	1 (=3)	4	Physics 102
2	COE 205	Computer Organization and Assembly Language	3	1 (=3)	4	COE 200 & ICS 201
3	COE 305	Micro System Design	3	1 (=3)	4	COE 205

COE Elective Courses

S.N	Course	Title	Credit hours	Laboratory Hours	Total Credit Hours	Pre-Requisites
1	COE 402	Computer System Performance Evaluation	3	0	3	STAT 319 or CI
2	COE 403	Advanced Microprocessor Architecture	3	0	3	COE 305
3	COE 405	Design and Modeling of Digital Systems	3	0	3	COE 308 or CI

CRITERION 2

D. Complete Table 4.3 showing curriculum breakdown in terms of mathematics and basic sciences, major requirements, social sciences and other requirements.

Semester	Course Number	Category (Credit Hours)				
		Maths & Basic Sciences		Core Courses	Humanities & Social Sciences	Technical Electives
		Maths	Basic Sci			
Total						
Minimum Requirements						

Table 4.3: Curriculum course requirements

CRITERION 2

- E. For each course in the program that can be counted for credit specify the following:
- **Course title**
 - **Course objectives and outcomes**
 - **Catalog description**
 - **Text book (s) and references**
 - **Syllabus breakdown in lectures**
 - **Computer usage**
 - **Laboratory**
 - **Content breakdown in credit hours (if applicable) as basic science, math, engineering science, and design for engineering discipline, general education requirements, business requirements and major requirements for the Business Studies and others.**

Standard 2-1:

The curriculum must be consistent and supports the program's documented objectives.

MEETING STANDARD 2-1

- Describe how the program content (courses) meets the program objectives
- Complete the matrix shown in Table 4.4 linking courses to program outcomes. List the courses and tick against relevant outcomes. A sample of such a matrix is shown in Appendix D.

PROGRAM OUTCOMES

Courses or Group of Courses	Program Outcomes			
	1	2	3	4
1				
2				
3				

Table 4.4: Courses versus program outcomes

PROGRAM OUTCOMES

Courses or Group of courses	Program Outcomes						
	1	2	3	4	5	6	7
COE 200, COE 205, COE 305, COE 360	+	+	+	+	+	+	+
COE 400, COE 485	+	+	+	+	+	+	+
COE 399, COE 350, 351, 352	+	+	+			+	+
COE 390							
COE 308	+						
COE 342	+	+					
COE 442	+	+					
ICS Courses	+	+	+	+			
Stat & Mathematics, Physics & Chemistry Courses	+			+			
English Courses					+		
IAS Courses					+		
EE Courses	+	+	+				+
Technical Electives	+			+		+	
COE Electives	+					+	
Courses Vs Program Outcomes							

Standard 2-2:

Theoretical background, problems analysis and solution design must be stressed within the program's core material:

- Indicate which courses contain a significant portion (more than 30%) of the elements in standard 2-2.

Elements	Courses
Theoretical Background	
Problem Analysis	
Solution Design	

Table 4.5: Standard 2-2 requirement

MEETING STANDARD 2-2

Example:

Element	Courses
Theoretical Background	All Courses with the exception of ENGL, IAS and PE (COE 350, 351, 352), and COE 390
Problem Analysis	All courses with the exception of ENGL, IAS and PE and COE 390.
Solution Design	COE 200, 205, 305, 360, 400, 485, ICS 202, 399, (COE 350, 351, 351)
Theory, Problem Analysis and Solution Design	

EXERCISE 3

Choose a course you are teaching currently or would like to teach:

Write 2-3 general objectives for the course:

- a)
- b)
- c)

Develop measurable outcomes aligned with one of the above goals:

- a)
- b)
- c)

- **Standard 2-3:**

The curriculum must satisfy the core requirements for the program, as specified by the respective accreditation body. Examples of such requirements are given in **Table A.1a**.

- **Standard 2-4:**

The curriculum must satisfy the major requirements for the program as specified by the respective accreditation body. Examples of such requirements are given in **Table A.1a**.

- **Standard 2-5:**

The curriculum must satisfy general education, arts, and professional and other discipline requirements for the program, as specified by the respective accreditation body. Examples of such requirements are given in **Table A.1a**.

Address standards 2-3, 2-4 and 2-5 using information provided in Table 4.4.

Programs	Maths. & Basic Sciences	Engineering Topics	General Education	Others

Table A.1a Minimum Requirements for Each Program (Program Semester Credit Hours)

HEC Requirements (Accreditation Council Requirements)

- Program Requirements
- Deviations
- Justification for Deviations

- **STANDARDS 2-6.**

- **Information technology component of the curriculum must be integrated throughout the program:**

Indicate the courses within the program that will satisfy the standard.

Describe how they are applied and integrated through out the program.

- **STANDARDS 2-7.**

- **Oral and written communication skills of the student must be developed and applied in the program:**

Indicate the courses within the program that will satisfy the standard.

Describe how they are applied.

CRITERION 3

LABORATORIES AND COMPUTING FACILITIES

- Laboratories and computing facilities must be adequately available and accessible to faculty members and students to support teaching and research activities. To meet this criterion the standards in this section must be satisfied. In addition departments may benchmark with similar departments in reputable institutions to identify their shortcomings, if any.
- Provide the following information about the laboratories and computing facilities: Describe the laboratory/computer facilities that are available for use in the program under assessment. Indicate for each lab the following

LABORATORIES AND COMPUTING FACILITIES

- **Laboratory Title**
- **Location and area**
- **Objectives**
- **Adequacy for Instruction**
- **Courses taught**
- **Software Available (if applicable)**
- **Major Apparatus**
- **Major Equipment**
- **Safety Regulations**

Standard 3-1

Laboratory manuals/documentation/instructions for experiments must be available and readily accessible to faculty and students:

- Explain how students and faculty have adequate and timely access to the manuals/documentation and instructions.
- Benchmark with similar departments in reputable institutions to identify short comings in laboratory.

Standard 3-2

There must be adequate support personnel for instruction and maintaining the laboratories:

- Indicate for each laboratory, support personnel, level of support, nature and extent of instructional support

Standard 3-3

The University computing infrastructure and facilities must be adequate to support program's objectives:

- Describe how the computing facilities support the computing component of your program.
- Benchmark with similar departments in reputable institutions to identify short comings in computing infrastructure and facilities if any

CRITERION 4

STUDENT SUPPORT AND ADVISING

- Student must have adequate support to complete the program in a timely manner and must have ample opportunity to interact with their instructors and receive timely advice about program requirements and career alternatives. To meet this criterion the standards in this section must be satisfied.

Standard 4-1

Courses must be offered with sufficient frequency and number for students to complete the program in a timely manner:

Provide the department's strategy for course offerings.

Explain how often required courses are offered.

Explain how often elective courses are offered.

Explain how required courses outside the department are managed to be offered in sufficient number and frequency.

Standard 4-2

Courses in the major must be structured to ensure effective interaction between students, faculty and teaching assistants:

Describe how you achieve effective student / faculty interaction in courses taught by more than one person such as two faculty members, a faculty member and a teaching assistant or a lecturer.

Standard 4-3

Guidance on how to complete the program must be available to all students and access to qualified advising must be available to make course decisions and career choices:

- Describe how students are informed about program requirements.
- Describe the advising system and indicate how its effectiveness is measured.
- Describe the student counseling system and how students get professional counseling when needed.
- Indicate if students have access to professional counseling; when necessary.
- Describe opportunities available for students to interact with practitioners, and to have membership in technical and professional societies.

CRITERION 5

PROCESS CONTROL

- The processes by which major functions are delivered must be in place, controlled, periodically reviewed, evaluated and continuously improved. To meet this criterion a set of standards must be satisfied.

Standard 5-1

The process by which students are admitted to the program must be based on quantitative and qualitative criteria and clearly documented. This process must be periodically evaluated to ensure that it is meeting its objectives:

- Describe the program admission criteria at the institutional level, faculty or department if applicable.
- Describe policy regarding program / credit transfer.
- Indicate how frequently the admission criteria are evaluated and if the evaluation results are used to improve the process.

ADMISSION CRITERIA

Eligibility to a BS CS Program: 60% marks in F.Sc / Intermediate or Equivalent in A-level.

Criterion:

Marks obtained in F.Sc / Equivalent : 60%

Admission test: : 30%

Interview. : 10%

Merit lists displayed.

Call letters to admitted students sent.

Roll nos. issued.

Deposit of fee.

Registration.

Standard 5-2:

The process by which students are registered in the program and monitoring of students progress to ensure timely completion of the program must be documented This process must be periodically evaluated to ensure that it is meeting its objectives:

- Describe how students are registered in the program.
- Describe how student's academic progress is monitored and how their program of study is verified to adhere to the degree requirements.
- Indicate how frequently the process of registration and monitoring are evaluated and if the evaluation results are used to improve the process.

Standard 5-3

The process of recruiting and retaining highly qualified faculty members must be in place and clearly documented. Also processes and procedures for faculty evaluation, promotion must be consistent with institution mission statement. These processes must be periodically evaluated to ensure that it is meeting with its objectives:

- Describe the process used to ensure that highly qualified faculty is recruited to the program.
- Indicate methods used to retain excellent faculty members.
- Indicate how evaluation and promotion processes are in line with institution mission statement.
- Indicate how frequently this process is evaluated and if the evaluation results are used to improve the process.

Standard 5-4

The process and procedures used to ensure that teaching and delivery of course material to the students emphasizes active learning and that course learning outcomes are met. The process must be periodically evaluated to ensure that it is meeting its objectives:

- Describe the process and procedures used to ensure that teaching and delivery of course material is effective and focus on students learning.
- Indicate how frequently this process is evaluated and if the evaluation results are used to improve the process.

Standard 5-5

The process that ensures that graduates have completed the requirements of the program must be based on standards, effective and clearly documented procedures. This process must be periodically evaluated to ensure that it is meeting its objectives:

- Describe the procedures used to ensure that graduates meet the program requirements.
- Describe when this procedure is evaluated and whether the results of this evaluation are used to improve the process

CRITERION 6

FACULTY

- Faculty members must be current and active in their discipline and have the necessary technical depth and breadth to support the program. There must be enough faculty members to provide continuity and stability, to cover the curriculum adequately and effectively, and to allow for scholarly activities. To meet this criterion the standards in this section must be satisfied.

Standard 6-1

There must be enough full time faculty who are committed to the program to provide adequate coverage of the program areas/courses with continuity and stability. The interests and qualifications of all faculty members must be sufficient to teach all courses, plan, modify and update courses and curricula. All faculty members must have a level of competence that would normally be obtained through graduate work in the discipline. The majority of the faculty must hold a Ph.D. in the discipline:

- Each faculty member should complete a resume, prepared in a format included in Appendix B.
- Information recorded in **Table 4.6** and faculty member's resumes will be sufficient to validate standard 6 – 1.

- Complete the following table indicating program areas and number of faculty in each area.

FACULTY DISTRIBUTION BY PROGRAM AREAS

Program's area of specialization	Courses in the area and average number of sections per year	Number of faculty members in each area	Number of faculty with Ph.D. degree
Area 1			
Area 2			
Area 3			
Area 4			
Total			

Table 4.6: Faculty distribution by program areas.

- Each faculty member should complete a resume, prepared in a format included in Appendix B.

FACULTY RESUME

Name:	
Personal:	May include address(s) and phone number(s) and other personal information that the candidate feels is pertinent.
Experience	List current appointment first, each entry as follows: Date, Title, Institution.
Honors and Awards	List honors or awards for scholarship or professional activity
Memberships	List memberships in professional and learned societies, indicating offices held, committees, or other specific assignments.
Graduate Students, Postdocs, Undergraduate Students, Honor Students	List supervision of graduate students, postdocs and undergraduate honors theses showing: Years Degree Name Show other information as appropriate and list membership on graduate degree committees.

FACULTY RESUME

Service Activity	List University and public service activities.
Brief Statement of Research Interest	May be as brief as a sentence or contain additional details up to one page in length.
Publications	<p>List publications in standard bibliographic format with earliest date first.</p> <ul style="list-style-type: none"> ▪ Manuscripts accepted for publication should be included under appropriate category as “in press;” ▪ Segment the list under the following standard headings: <ul style="list-style-type: none"> . Articles published by refereed journals. . Books . Scholarly and / or creative activity published through a refereed electronic venue. . Contribution to edited volumes. . Papers published in refereed conference proceedings. . Papers or extended abstracts published in conference proceedings. (refereed on the basis of abstract) . Articles published in popular press. . Articles appearing in in-house organs. . Research reports submitted to sponsors. . Articles published in non – refereed journals. . Manuscripts submitted for publication. (include where and when submitted)

FACULTY RESUME

Research Grants and Contracts	<p>Entries should include:</p> <ul style="list-style-type: none">• Date• Title• Agency / Organization• Total Award Amount <p>Segment the list under following headings:</p> <ul style="list-style-type: none">▪ Completed▪ Funded and in progress▪ In review
Other Research or Creative Accomplishments	List patents, software, new products developed, etc.
Selected Professional Presentations	

Standard 6-2

All faculty members must remain current in the discipline and sufficient time must be provided for scholarly activities and professional development. Also, effective programs for faculty development must be in place:

- Describe the criteria for faculty to be deemed current in the discipline and based on these criteria and information in the faculty member's resumes, what percentage of them is current. The criteria should be developed by the department.
- Describe the means for ensuring that full time faculty members have sufficient time for scholarly and professional development.
- Describe existing faculty development programs at the departmental and university level. Demonstrate their effectiveness in achieving faculty development.
- Indicate how frequently faculty programs are evaluated and if the evaluation results are used for improvement.

Standard 6-3

All faculty members should be motivated and have job satisfaction to excel in their profession:

- Describe programs and processes in place for faculty motivation.
- Obtain faculty input using faculty survey (Appendix 'C') on programs for faculty motivation and job satisfaction.

FACULTY SURVEY

Very Satisfied (A)	Satisfied (B)	Neutral (C)	Dissatisfied (D)	Very Dissatisfied (F)
--------------------	---------------	-------------	------------------	-----------------------

1. Your mix of research, teaching and community service.

--	--	--	--	--

2. The intellectual stimulation of your work.

--	--	--	--	--

3. Type of teaching / research you currently do.

--	--	--	--	--

4. Your interaction with students.

--	--	--	--	--

5. Cooperation you receive from colleagues.

--	--	--	--	--

6. The mentoring available to you.

--	--	--	--	--

7. Administrative support from the department.

--	--	--	--	--

FACULTY SURVEY

Very Satisfied (A)	Satisfied (B)	Neutral (C)	Dissatisfied (D)	Very Dissatisfied (F)
--------------------	---------------	-------------	------------------	-----------------------

8. Providing clarity about the faculty promotion process.

--	--	--	--	--

9. Your prospects for advancement and progress through ranks .

--	--	--	--	--

10. Salary and compensation package.

--	--	--	--	--

11. Job security and stability at the department.

--	--	--	--	--

12. Amount of time you have for yourself and family.

--	--	--	--	--

13. The over all climate at the department.

--	--	--	--	--

FACULTY SURVEY

14. What are the best programs / factors currently available in your department that enhance your motivation and job satisfaction?

15. Suggest programs / factors that could improve your motivation and job satisfaction?

FACULTY SURVEY

- **INFORMATION ABOUT FACULTY MEMBER.**

1. **Academic Rank:**

A: Professor B: Associate Prof. C: Assistant Professor
D: Instructor E: Lecturer

2. **Years of service (in years):**

A: 1 - 5 B: 6 - 10 C: 11 – 15 D: 16 - 20 E: > 20

CRITERION 7

INSTITUTIONAL FACILITIES

- Institutional facilities, including library, classrooms and offices must be adequate to support the objective of the program. To satisfy this criterion a number of standards must be met.

Standard 7-1:

The institution must have the infrastructure to support new trends in learning such as e-learning:

Describe infrastructure and facilities that support new trends in learning.

Indicate how adequate the facilities are.

Standard 7-2:

The library must possess an up-to-date technical collection relevant to the program and must be adequately staffed with professional personnel:

Describe the adequacy of the library's technical collection.

Describe the support rendered by the library.

Standard 7-3:

Class-rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibilities:

Describe the adequacy of the classrooms.

Describe the adequacy of faculty offices

CRITERION 8

INSTITUTIONAL SUPPORT

- The institution's support and the financial resources for the program must be sufficient to provide an environment in which the program can achieve its objectives and retain its strength.

Standard 8-1:

There must be sufficient support and financial resources to attract and retain high quality faculty and provide the means for them to maintain competence as teachers and scholars:

- Describe how your program meets this standard. If it does not explain the main causes and plans to rectify the situation.
- Describe the level of adequacy of secretarial support, technical staff and office equipment.

Standard 8-2:

There must be an adequate number of high quality graduate students, research assistants and Ph.D. students:

Provide the number of graduate students, research assistants and Ph.D students for the last three years.

Provide the faculty to graduate student ratio for the last three years.

Standard 8-3:

Financial resources must be provided to acquire and maintain Library holdings, laboratories and computing facilities:

Describe the resources available for the library.

Describe the resources available for laboratories.

Describe the resources available for computing facilities.

CONCLUDING REMARKS

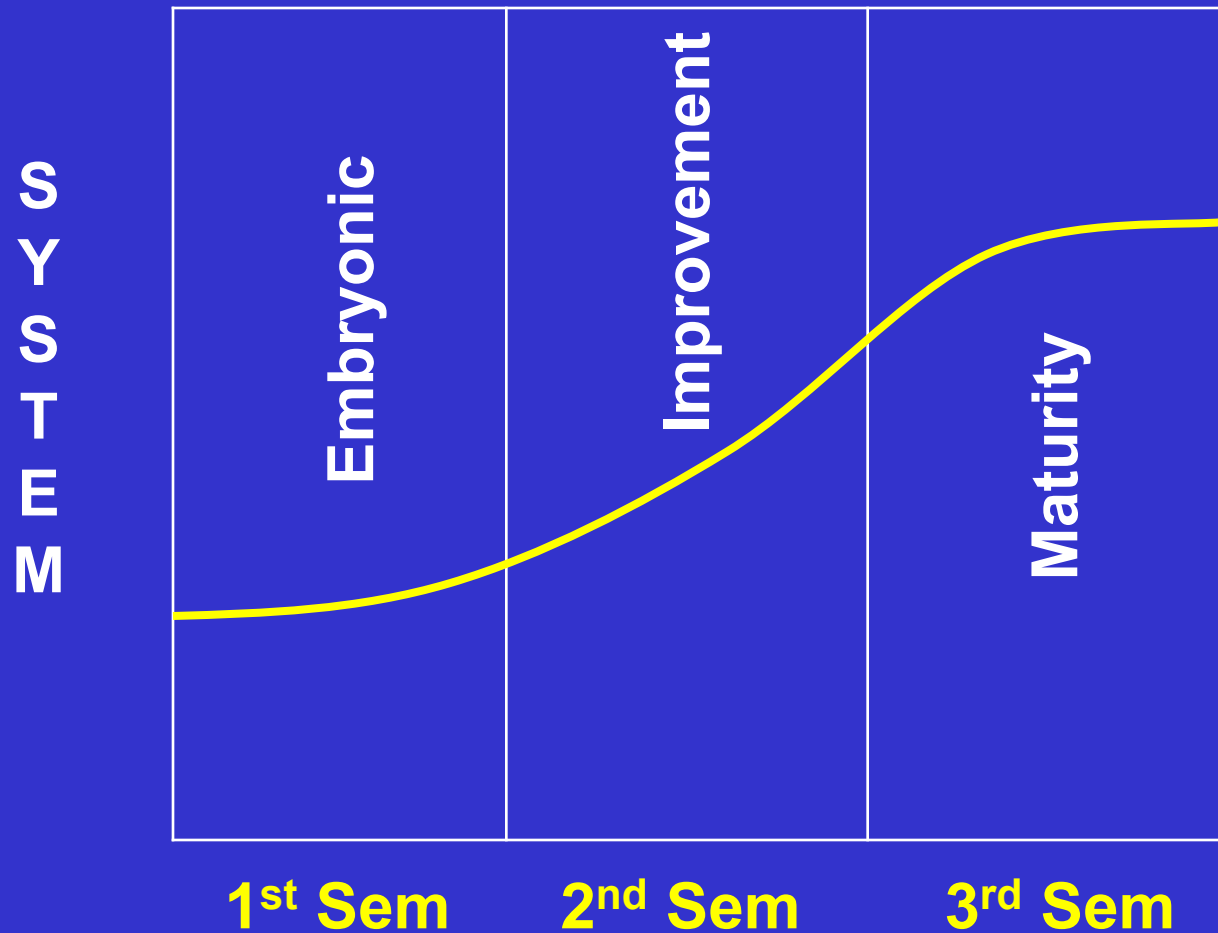
- **Self assessment will:**
- **provide feedback from employers and Alumni and will enable Universities to improve quality and respond effectively to market needs.**
- **require dedication from faculty members and commitment from University Administration.**
- **establish measurable objectives and evaluate their outcomes to assess if programs meet their educational objectives.**
- **facilitate to enhance learning.**

CONCLUDING REMARKS

- Assessing academic programs must be supported by other types of assessment.
- The Dean QEC should take the lead in making faculty members and Administration aware of the big role assessment plays in Education.

QA SYSTEM MATURITY LOGIC

An S-Curve



ACTION PLAN

ACTIVITY	DATE
LQEC to initiate Self Assessment (SA) for all the dept through the office of Hol <i>(with info to HQ NUST)</i>	By the end of 1 st week of semester.
Dept to form the Program Team (PT) for each program offered by the dept <i>(with info to HQ NUST)</i>	By the end of 2 nd week of semester.
Each PT to prepare a Self Assessment Report (SAR) about the relevant program and submit to LQEC in two months	By the end of 10 th week of semester
LQEC to review the Documentation within one month <i>(and send final copy of SAR to HQ NUST)</i>	By the end of 14 th week of semester.
Head of the Institution (Hol) to form the program Assessment Team (AT) for each program <i>(with info to HQ NUST thro' LQEC)</i>	By the end of 14 th week of semester

ACTION PLAN

ACTIVITY	DATE
LQEC to plan and schedule AT visit <i>(with info to HQ NUST)</i>	By the end of 14 th week after semester
AT to conduct assessment and present its findings to LQEC, Dean, PT and dept. faculty	By the end of 4 th week after the visit
LQEC to submit an executive summary to the Hol <i>(with a copy to HQ NUST)</i>	By the end of 6 th week after the visit
Dept to prepare and submit implementation plan (as per Table A.2) to LQEC <i>(with a copy to HQ NUST)</i>	By the end of 6 th week after the visit
LQEC to follow the application of implementation plan	
LQEC to review the implementation plan once a semester to assess the progress and submit <i>Progress Report</i> to Hol <i>(with a copy to HQ NUST)</i>	By the end of semester

CONCLUSION

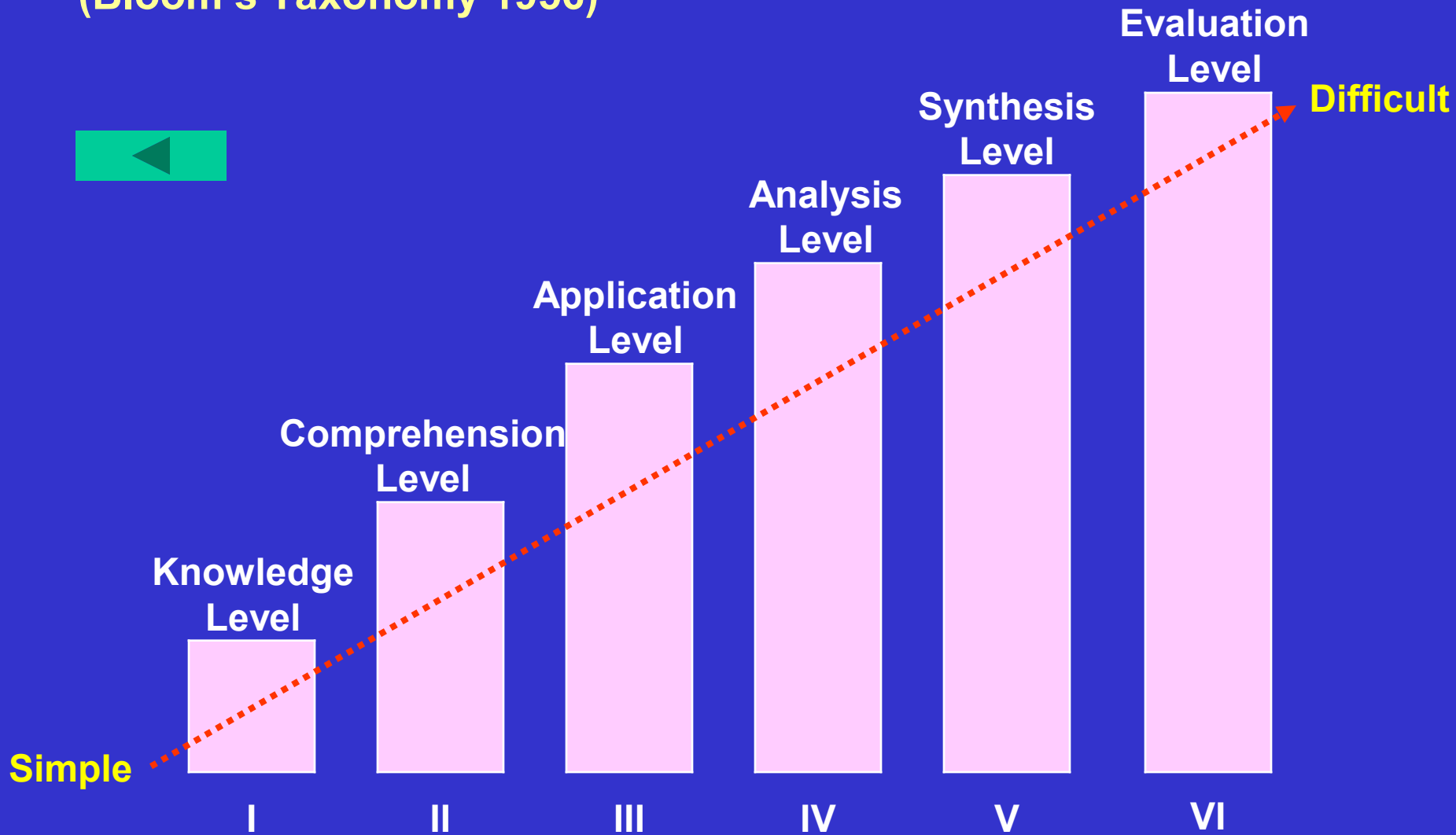
**Achieving Quality and Enhancing it
by
Continuous Improvement
Through
Self Assessment Which Forms The
Basis for External Assessment.**

THANK YOU

Any questions / Comments

COGNITIVE LEARNING

(Bloom's Taxonomy 1956)



PROCESS OF EVALUATION

- **Self Assessment**
- **University Internal Review**
- **External Review**

