DEGREE ACCREDITATION MANUAL

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1. INTRODUCTION

Formed in 1976, the Computer Society of Sri Lanka or CSSL is considered the apex body for practitioners, academics, students, policy makers, professionals and members of the business community in Sri Lanka. Internationally it is recognized as a member of IFIP, the **I**nternational **F**ederation for **I**nformation **P**rocessing. IFIP is the leading multinational, apolitical organization in Information & Communication Technologies and Sciences, which is recognized by the United Nations and other world bodies. The CSSL is also the Sri Lankan representative in the South East Asia Regional Computer Confederation (SEARCC) which is the forum of National Information Technology Professional Societies in the Asia Pacific region.

The CSSL is consulted by the apex ICT agency of the government, ICTA, in forming policy related to ICT. In addition, the University Grants Commission (UGC) has recognized CSSL as the accreditation body for Computing Degrees aimed at students from the technology stream at GCE Advanced Level examination. CSSL is a permanent member of the standing committee on computing.

This manual outlines the criteria and procedure for accreditation of four year programmes on computing and IT related degrees based on Seoul Accord. The Seoul Accord is an international accreditation agreement for professionals in Computing and IT related academic degree programmes. It is a mutually recognised agreement by its signatories. The signatories are committed to develop and recognise good practices in computing and IT related education.

2. DEFINITIONS

2.1 General

- CSSL - Computer Society of Sri Lanka
- Council - Council of the CSSL
- CSSLAB - Computer Society of Sri Lanka Accreditation Board
- Panel - A team of evaluators appointed to undertake accreditation activities

2.2 Higher Educational Institution Programme

- HEI - An institution authorized by legislation to award degrees
- Multi-campus - An HEI which operates from more than one physical location
- Programme - A structured educational experience conducted by a HEI or a multi-campus, or by distance learning, undertaken by students. Successful completion of the programme leads to the award of a computing or IT related degree.
- Degree - A four year graduate level qualification normally titled
  "Bachelor of Science in" or "Bachelor of"
  Information Technology
  Computer Science
  Computing
  Information Systems
  Information Technology
  Computer Systems Engineering
  Software Engineering
  Information and Communication Technology
  or any other acceptable variation.
- Academic Staff - The staff responsible for teaching in the programme leading to the award of the degree
- Full-Time Staff - Staff who substantially teach full-time at the HEI
- Part-Time Staff – Staff on contract who work for a limited period for 1/2-day a week or more and typically teach at least 50% of a course module.

- Visiting Staff - Staff from other HEIs or practicing Computing and IT related specialists from the industry doing teaching or giving instructions on a part-time basis, less than 1/2-day a week.
- Assessment - Judgement of the student's work by the HEI
- Examiner - Academic staff responsible for evaluation of student's work
- Moderator - Academic staff or an agent appointed to ensure the student evaluation by examiner to be reasonable and of acceptable quality
- Evaluation - Judgement of the programme by the HEI or its appointed agent
- External Examiner - A person with high academic standing, outside the HEI who scrutinizes and reports on examination and assessment of the programme
- Stakeholders - All groups having an interest in Computing and IT related education and its outcome
- OBE - Outcome Based Education
- PEOs – Programme Educational Objectives
- PLOs – Programme Learning Outcomes
- MLOs – Module Learning Outcomes
- ICC - Industry Consultative Committee, a body consisting of professionals from industries, government, professional organizations, regulatory bodies, alumni, etc appointed by the HEI to ensure the programme relevance to the stakeholders' needs
- Accredited degree – A degree, the holder of which will be considered to have fulfilled the *academic* requirements to become a member of CSSL / Chartered IT Professional (CITP).

2.3 Accreditation

There are two different categories of accreditation.

a) Full Accreditation – A programme that fully satisfies the minimum standard for accreditation set by CSSL. Full Accreditation will normally be given to programmes where students have graduated at least one year before the date of accreditation. It is normally given for a period of five years from the date of accreditation.

b) Provisional Accreditation – Provisional Accreditation may be awarded to a new programme, before 1 year after the graduation of the first batch, when its quality meets CSSL requirements. Provisional Accreditation does not guarantee full accreditation if the HEI fails to maintain the standards of the programme.

In addition, CSSL may perform an informal assessment of a new programme of study at an appropriate time during its development stage. This will result in a report to the HEI, but will not result in an accreditation.

3. CSSL ACCREDITATION BOARD AND EVALUATION PANEL

The accreditation policy of CSSL on Computing and IT related degrees is laid down by the Council on the recommendation of the CSSLAB. The implementation of the policy and any amendments to the policy is the responsibility of CSSL.

3.1 Accreditation Board

CSSL shall appoint at least eight members to the Accreditation Board.

The Accreditation Board (CSSLAB) will consist of,

- A chairman
- At least four members from HEIs
- At least five members from industry and
- At least two members of the CSSL Council

In appointing members to the CSSLAB, CSSL shall maintain a reasonable spread of various areas of expertise across different branches of Computing and IT related areas. Members should be persons of high repute and standing.

The Terms of Reference of the Board are to be to:

- assist CSSL in formulating and updating accreditation policies and criteria,
- recommend and/or amend guidelines and operating procedures for accreditation,
- appoint panels to evaluate undergraduate Computing and IT related degree programmes for accreditation purposes in accordance with criteria and procedures,
- oversee all operational arrangements,
- respond to any complaints or appeals concerning the accreditation process and to any proposals for change,
- recommend actions for implementing and maintaining international accreditation agreements,
- report periodically to the Council on its work, and when appropriate, recommend changes to the policy on accreditation,
- foster dissemination of developments and best practices in the education programmes of Computing and IT related areas,
- advise CSSL on public statements or representations that should be made in relation to education of Computing and IT related areas,
- advise and assist Sri Lankan HEIs in reviewing and making improvements to education programmes of Computing and IT related areas and
- collaborate with other standing committees of CSSL on issues of mutual benefit.

3.2 Panel

A Panel is appointed by the CSSLAB to carry out the evaluation process of a HEI which applies for accreditation. The Panel shall visit the HEI as part of its evaluation process.
The Panel shall consist of persons chosen for their experience in Computing and IT related areas and ability to evaluate degree programmes and shall comprise

- ✓ A chairman,
- ✓ One person from Industry
- ✓ One person from Academia
- ✓ One international member from a Seoul Accord signatory.

In the event that one member of the Panel is unable to participate during the days of the visit to HEI, the Panel will decide to proceed with the rest of the Panel members. If a replacement is essential, the Panel will request CSSLAB to appoint another suitable member.

Additional persons may be included as needed.
The Panel may include observers as authorised by the CSSLAB.
A secretary will also be included to assist in the preparation of reports.
The Secretary of the Panel will not be a member of the Panel, but shall accompany the Panel in visits, request clarification/facilitate, and compile the evaluation report under the direction of the Chairman.

The Panel may be expanded appropriately if two or more degree programmes are being accredited.

4.0 ACCREDITATION POLICY

4.1 Purpose of Accreditation

Computing and IT related professionals have become essential to economic development as well as in providing services to society. Because of the universally essential nature of computer

applications and the mobility of professionals across boundaries due to globalization, there is a need to identify academic programmes that adequately prepare graduates for entry into the Computing and IT related professions based on recognized knowledge and abilities across boundaries. Seoul Accord is established as a mechanism of mutually recognizing graduates among signatories of the accord. The accord is based on the principle of equivalence of educational preparation for entry to a computing profession.

Accreditation based on Seoul Accord places emphasis on the quality of students, academic staff and the teaching facilities as well as on the necessity for continuous improvement of programmes based on OBE as the stakeholder requirements change.

Accreditation provides public awareness on computing and IT related programmes that guarantee successful graduate entry into the profession. It provides feedback to the government and the HEI of the basic requirements of a graduate in computing and IT related programmes and the level of resources needed to meet the requirements and meet internationally accepted standards.

4.2 Generic Attributes of a Computer Professional
- Seoul Accord Graduate Attributes (SAGA) -

The SAGA is intended to define the scope and standard of programmes that are recognized by the Seoul Accord. It is an outcome based accreditation system for international recognition. The outcomes are individually measurable and indicate the potential competency and performance of a graduate.

There are ten graduate generic attributes of a Computer Professional. They are:

i. **Academic Education:** Completion of an accredited programme of study designed to prepare graduates as computing professionals
ii. **Knowledge for solving computing problems:** Ability to apply knowledge of a computing specialization and mathematics and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computer models from defined problems and requirements
iii. **Problem analysis:** identify and solve complex problems reaching substantial conclusions using principles of mathematics, computing sciences and relevant domain disciplines
iv. **Design/Development:** design and evaluate solutions for complex computing problems, and design evaluate systems, components, or processes that meet specified needs
v. **Modern Tool Usage:** create, select or adapt and apply appropriate techniques, resources and modern computing tools to complex computing activities, with an understanding of the limitations
vi. **Individual and Team Work:** function effectively as an individual and as a member or leader of a team in multidisciplinary settings
vii. **Communication:** communicate effectively with the computing community about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, give and understand clear instructions
viii. **Computing Professionalism and Society:** understand and assess societal, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice
ix. **Ethics:** understand and commit to professional ethics, responsibilities, and norms of professional computing practice
x. **Life-long Learning:** recognize the need and have the ability to engage in independent learning for continual development as a computing professional.

These graduate attributes of a 'Computer Professional' are given in detail in the Seoul Accord, for clarity in comparison with similar attributes expected from 'Computer Technologist' and 'Computer Technician', Appendix A.

4.3 Learning Environment and Exposure to Professional Practice

The accreditation process considers it important that the programme is conducted under a suitable environment conducive for learning with creativity and innovation among young learners and that the learners are exposed to Professional practice early.

a) Learning Environment

The quality of the degree programme depends on the quality of the learning environment. The environment must include academic staff and their commitment, the support staff and their necessary input, teaching facilities such as laboratories, libraries and computing and IT facilities.

The number of academic staff devoted for this programme including part-time and visiting staff must be large enough to effectively cover all modules of the curriculum of the programme. It is important that there is sufficient qualified and experienced full-time academic staff to provide for adequate staff-student interaction on academic matters. They must also provide student counselling and support actively in the development and administration of the curriculum.

b) Exposure to Professional Practice

It is essential that students are exposed to professional computing practice early. Such exposure should be continued throughout the programme to enable them to develop a professional approach and experience professional ethics anticipated in the world of work. As such the programme should include a combination of the following:-

- Use of staff with industry experience
- Use of guest lectures from industry
- Use of industry visits
- Industry-based projects, particularly in the final year
- Mandatory exposure and assessment on professional ethics and conduct
- Practical experience in a computing and IT environment outside the teaching environment

5.0 CRITERIA FOR ACCREDITATION

The accreditation of a Computing and IT related programme by CSSL is carried out by CSSLAB. The process involves discussions with stakeholders and the inspection of the self-assessment report (Appendix B) and the following documents:-

a) Structure of the academic programme, the curriculum, modules included in the curriculum, module descriptors and assessment schemes
b) Design work, project work and industrial training
c) Student feedback and peer evaluation reports
d) Teaching facilities such as class rooms, study areas, the library, computing and IT facilities, learning management system and general infrastructure
e) Quality Management System.

5.1 The academic programme

The criteria for curriculum content specified in the following sections ensure that the graduate receives a foundation in mathematics, business, accounting, management, economics or similar areas, necessary science not covered at secondary school level, a broad preparation in Computing and IT related knowledge with other non-technical subjects to produce a computer professional valuable to the world of work. The curriculum should include sufficient activities on developing solutions to complex problems and carrying out projects. These components should be judged to ascertain that the curriculum serves and promotes creativity and innovation in Computing and IT-related education in addition to good practices.

5.1.1 Definition of Academic Credit

- The volume of learning is described in terms of Academic Credits.
- In the Sri Lanka Qualification Framework (SLQF), the student workload of a study programme is defined as 1500 Notional Learning Hours (NLH) per academic year.
- Therefore the workload of a 4 year study programme is 6000 NLH.
- Notional Learning Hours (NLH) includes Direct Learning Hours (DLH) with teachers and trainers, and Self Learning Hours (SLH) where the student works on preparation for and carrying out assignments and assessments.
- NLH = DLH + SLH
- According to SLQF, the workload in a particular module in the curriculum is based on the total amount of learning activities of a student to achieve the specified learning outcomes of the module. One Academic Credit is considered equivalent to 50 NLH for a taught module, laboratory module or field studies module. In the case of industrial training, including time allocated for assessments for literature survey, one academic credit is considered equivalent to 100 NLH.
- Academic Credit value for 'development and project' work in the curriculum such as the final year project is not specified in the SLQF. As such CSSL considers the academic credit value for Final Year Project (FYP) based on the specified learning outcomes should be a minimum of 300 NLH which is equivalent to 6 academic credits.
- According to SLQF, a four year Bachelors Honours degree programme corresponds to SLQF level 6 and the minimum volume of learning for the award of the degree is 120 Academic Credits after meeting the requirements of SLQF Level 2.

5.1.2 Requirements of the 4 year Academic Programme

For accreditation, a Bachelors degree programme in Computing and IT-related areas must be of a normal duration of not less than four (4) academic years of full-time equivalent study based on entry through a satisfactory level of achievement in relevant subjects at the General Certificate of Education (Advanced Level) examination conducted by the Department of Examinations, Sri Lanka, or through an equivalent qualification meeting SLQF Level 2. This may include a satisfactory foundation programme of minimum duration one year after GCE O/L.

The CSSLAB must be satisfied that the programme title is appropriate for all students graduating in the programme irrespective of the options taken, as a programme may have several options. CSSLAB will examine all options, to be satisfied that each option meets the established criteria. The entire programme must include a minimum of 120 Academic Credits (ACs) after SLQF level 2 with at least 60 Academic Credits being allocated to Computing and IT-related modules of the curriculum. Laboratory experience must be an integral component of the curriculum, with instructions on safety procedures wherever appropriate. The curriculum must ensure that students learn independently, and are exposed to Computing and IT related research and development activities. It must ensure that the students are made aware of the role and responsibilities of their profession such as ethics, equity and public safety.

5.1.3 Structure and Content of the Academic Programme

The structure and content of the programme curriculum must be consistent with the anticipated Programme Educational Objectives (PEOs), Programme Learning Outcomes (PLOs) and the Module Learning Outcomes (MLOs) of curriculum modules. The curriculum must combine technical, professional, and general education components to prepare students for a career, further study, and life-long professional development in Computing and IT related areas associated with the programme.

The curriculum requirements for accreditation specify topics, but do not prescribe specific modules. The programme must include mathematics appropriate to the discipline and of up-to-date coverage of fundamental and advanced computing topics that provide both breadth and depth. The computing and IT related topics must include:

a) Techniques, skills, and tools necessary for computing and IT related practice,

b) Principles and practices for secure computing,

c) Local and global impacts of computing solutions on individuals, organizations, and society.

The Academic requirement for the Computing and IT related curricula should be as given in Table 1 under several headings. The curriculum must include Core Computer /IT modules, Supplementary IT modules, essential non-IT modules in addition to specialized electives as a second major. The core modules should be delivered over the entire period of the programme. These requirements are given in Table 1.

Table 1 – Academic Credit requirements for degree accreditation

Academic Credit Requirement			**Minimum Academic Credits**
A	Computing / IT	A1. Core Computing/IT Modules	30
		A2. Supplementary Computing/IT Modules	60 – core
B	Non-Computing/IT	Mathematics	6
		Management, Commerce and Accounting	6
		Professional Practice	6
		English and Communication skills	6
C	Industrial Training		5
D	Final Year Project		6
	Total Minimum Academic Credits (not total of above)		**120**

A. Computing / IT Requirement (Minimum of 60 Academic Credits)

Table 2 shows the minimum credits required for each area of Core Computing / IT. Note that the sum of the minimum credits for each area is less than minimum credits for core modules.

Table 2 – Topics required for Computing / IT

A1. Core Computing/IT modules (minimum 30 Academic Credits)	Min Credits
Programming	6
Computer Systems (including operating systems, databases and platforms)	6
Software Engineering / Systems Engineering Life cycle	3
Computer Networks	3
Information Systems	3
IT Security	3
Software verification and validation (Quality Assurance and Testing)	3

Some of the topics that may be included under supplementary IT modules are given in Table 3.

Table 3 – Content under supplementary topics

A2. Supplementary Computer/IT - content in modules (minimum 30 Academic Credits)
Platform Technologies
User Experience Design
Web and Mobile Systems, Mobile Applications
Cloud Computing
Big Data
Data Analytics
Internet of Things
Virtualization and virtual systems
Software Construction (API design and use) ……. **# See Foot note 1.**
Construction tools (Development environments; User interface frameworks and tools; Unit testing tools; Profiling and performance analysis tools)
Engineering foundations ……..**## See Foot note 2.**
Software modeling and analysis
Problem analysis and reporting
Software process (Process concepts; Process implementation; Project planning and tracking; Software configuration management; Evolution processes and activities)
Software quality (Software quality concepts and culture; Process assurance; Product assurance)

B. Non-Computer/IT Modules (minimum 24 Academic Credits)	Min Credits
Mathematics: [Substantial portion of the following topics] Functions, relations, and sets; Basic logic (propositional and predicate); Proof techniques (direct, contradiction, and inductive); Basics of counting; Graphs and trees; Discrete probability; Finite state machines and regular expressions; Grammars; Numerical precision, accuracy and errors; Number theory	6
Management, Commerce, and Accounting [Substantial portion of the following topics] Fundamentals of Economics; Economics for IT (Value considerations throughout the software life cycle; Evaluating cost-effective solutions (e.g., benefits realization, tradeoff analysis, cost analysis, and return on investment)); Project management principles; Commerce; Accounting	6
Professional Practice Professional issues and responsibilities including social responsibility; Risk identification and evaluation; Environmental issues; Ethical, legal, and privacy issues; Professional Conduct; Intellectual property; Teamwork and conflict management; Employability skills and careers in IT	6
English and Communication Skills Reading, understanding, and summarizing; Writing (assignments, reports, evaluations, justifications, etc.); Team and group communication (both oral and written, email, etc.); Presentation skills	6

Foot note 1 – topics that may be included:
Software Construction (API design and use); Code reuse and libraries; Object-oriented runtime issues (e.g., polymorphism and dynamic binding); Parameterization and generics; Assertions, design by contract, and defensive programming; Error handling, exception handling, and fault tolerance; State-based and table-driven construction techniques; Runtime configuration and internationalization; Grammar-based input processing (parsing); Concurrency primitives (e.g., semaphores and monitors); Construction methods for distributed software (e.g., cloud and mobile computing); Constructing hardware/software systems; Performance analysis and tuning)

Foot note 2 – topics that may be included:
Empirical methods and experimental techniques (e.g., CPU and memory usage measurement); Statistical analysis (e.g., simple hypothesis testing, estimating, regression, and correlation.); Measurement and metrics; Systems development (e.g., security, safety, performance, effects of scaling, and feature interaction); Engineering design (e.g., formulation of problem, alternative solutions, and feasibility); Theory of measurement (e.g., criteria for valid measurement))

C. Exposure to Professional Practice in Computing and IT – Industrial Training

Industrial training in a practical computing environment would give the student a valuable experience into professional practice. Industry exposure would complement the formal studies at the educational establishment, and should ideally provide opportunity to observe human and industrial relations, identify the organisation structure, its maintenance, and security and safety aspects. The industry exposure will provide an opportunity to observe environmental procedures from the point of view of the general workforce as an important component in the career as a professional. CSSL requires that each student undergoes industrial training for a period of not less than twelve (12) weeks, and submits a report on the training certified by the employer's representative to enable assessment for the award of academic credits. The academic credits obtained for industrial training should be a minimum of 5 and maximum of 10 credits. In case the industrial training warrants a credit value greater than 10, then the extra credits should be considered above the minimum total of 120 academic credits required for the award of the degree.

D. Final Year Project

The programme must end with a project which provides significant experience in developing a solution to a real life problem facing IT and computing field or research or comprehensive survey, contributing to the knowledge in the field. Students must be given proper guidance on all aspects of the conduct of the project. It must include the selection of a project, the conduct, the supervisor, the conduct of the project and the method of assessment.

The project is expected to be carried out individually. However in the event the project is a group work, there should be clear identification of the part played by each individual student in achieving the goals of the project and the method of assessment accordingly known.

The project includes the submission of a written report by the student. The report must include the problem to be solved, background to the problem, a critical review of the problem, a description of the method employed to solve the problem, the results and a list of references used in carrying out the work.

5.2 Academic Staff, Students and Teaching Facilities

The educational experience and the learning process of the student are influenced by the competence and experience of the academic staff who undertake the process of teaching, the interest and dedication of the students. The teaching facilities available and the learning environment also determine the student learning experience.

5.2.1 Academic Staff

The number of academic staff devoted to the programme must be large enough to cover all areas included in the programme curriculum. The Institution may engage part-time and/or visiting staff members who are outstanding professionals in their fields, to cover certain subject areas in the curriculum outside the specialisations of the full-time staff.

The academic staff teaching courses of the curriculum should have a high level of competence and be dedicated to the aims of the programme. Normally, the academic staff should have a postgraduate degree, preferably at doctoral level. However, staff with a good first degree, and having sufficient industrial experience along with acceptable professional qualifications, could provide an industrial flavour to the programme.

For a batch of 100 students, a minimum Full-Time-Equivalent of 30 academic staff members must be maintained to conduct the 4-year degree programme in Computing and IT or a related area. This includes a Professor, a few Senior Lecturers with a PhD or MPhil, a few Senior Lecturers with a M.Sc.

degree, several Lecturers with a first degree. This may include visiting lecturers with industry experience.

The overall contribution of the academic staff will be determined by the level of academic education of its members, their backgrounds, dedication, communication skills, and experience in teaching and research. Academic staff scientific publications, their participation in professional and scientific organizations and/or learned societies and their contribution towards students' curricular activities would add value to the degree accreditation process.

The academic staff should have adequate time for research and professional development activities. As such the HEI must ensure a suitable environment for research and professional development of their academic staff. The academic staff must also provide counselling to students on academic and career issues.

For effective teaching, the equivalent full-time academic staff to student ratio should be maintained at 1:15, or better. There must also be a sufficient number of trained and qualified members of support staff to assist in the conduct of the programme.

5.2.2 Students

The entry qualification of students for Computing and IT related programmes in Sri Lanka is three passes in the General Certificate of Education (Advanced Level) examination, or an equivalent or a Foundation programme of at least one year after passing GCE O/L.

The students should acquire English language skills to follow the course in English medium. A pass in 'English Language' at the GCE O/L examination (or equivalent) at entry point will provide an acceptable knowledge of English language to follow the degree programme. At graduation, the exit point, the students should have passed an examination equivalent to UTEL (University Test of English Language) [Level 8].

5.2.3 Teaching Facilities

The learning environment of the student influences the quality of his educational experience. Therefore, there must be suitable classrooms with audio-visual and projection facilities, e-learning facilities, study areas, a good library, up-to-date computing facilities and general infrastructure facilities. Housing, dining, sports, recreational, cultural and social facilities are expected to be also available.

For programmes offered at remote locations, and those offered in the distance mode, reliable communication facilities should be provided to enable those students to have a learning experience similar to on-campus students. Computing and IT related facilities should be similar to on-campus students. Facilities for student-staff interaction must also be similarly available as for on-campus students. On-campus students and off-campus students of the programme should be encouraged to participate in co-curricular as well as extracurricular activities of the University.

5.3 Quality Management System

5.3.1 Institutional Support and Leadership

The HEI must demonstrate through its corporate plan that quality education is an important aspect of its activities. The Institution must have policies and methods for development of Computing and IT related education programmes which include academic staff development activities.

The HEI must have policies and methods for funding the programme for attracting and retaining well-qualified experienced staff. HEI must also demonstrate that it provides and updates infrastructure and

support services periodically. HEI must ensure that proper leadership is available to the Institution through the appointment of well-qualified and experienced senior staff.

5.3.2 The Programme of Study and Scheme of Assessment

HEI should be able to demonstrate that the educational programme is based on OBE (Outcome Based Education) system as given in Appendix C. The curriculum development, the teaching- learning process and student assessments are implemented accordingly.

The educational management process should include, among others,

i. Curriculum development,
ii. Module descriptors including assessment of each module,
iii. System of assessment and criteria for a Pass, Fail and Grades,
iv. Examination regulations,
v. Procedures for preparation and moderation of examination question papers,
vi. Maintaining the standard of examination papers
vii. Assessment and moderation procedures of final year projects and other similar development projects
viii. Assessment of industrial training.

The HEI should have one or more External Examiners for each programme of study to independently examine and report on the programme, including examinations and assessment. The main objective of having External Examiners is to benchmark a programme of study to internationally accepted levels and address identified shortcomings regularly. Therefore, External Examiners should be selected from institutions accredited by the Seoul Accord or internationally recognized institutions at the forefront of Computing and IT Education. External examiner reports should be available for the CSSL visiting panel.

5.3.3 Programme Educational Objectives (PEOs) and Programme Learning Outcomes (PLOs)

Programme Educational Objectives or PEOs are broad statements that describe what graduates are expected to attain within three to five years of graduation. PEOs are based on the needs of the programme's constituencies and could be,

- capable of providing leadership in the organization he works in
- capable of conducting research for his organization.

Programme Learning Outcomes (PLOs) are outcomes that describe what students are expected to know and are able to do by the time of graduation. These relate to the knowledge, skills and attitudes that students acquire as they progress through the programme.

5.3.4 Programme Learning Outcomes (PLOs) and Module Learning Outcomes (MLOs)

The HEI must have acceptable mechanisms to ensure that the stated programme learning outcomes are met through the module learning outcomes. Module learning outcomes through the curriculum are continuously reviewed and improved.

Computing and IT related degree programmes are required to specify the abilities and characteristics that students are expected to possess upon graduation. These outcomes must reflect the needs of the students and the employers. The degree programme should develop and implement assessment processes to demonstrate that their graduates have acquired the stated programme learning outcomes.

The system must include:

- Documentary evidence on programme planning, curriculum development and regular curriculum review.
- The introduction of new programmes or majors must relate to the programme educational objectives and needs of the country.
- An admissions system that ensures an acceptable standard of entry for students.
- Processes for taking feedback and comments from stakeholders and representatives of the relevant groups for continuous improvement of programme objectives, curriculum and content, and evidence of actions taken.
- Quality Management system should include graduate employment data, alumni surveys and their achievements.
- Evidence of participation of practising professionals in Computing and IT related areas and leading employers of computer graduates to ensure educational quality of the programme, graduate performance and industry expectations.
- There must be evidence of a process for comparing or benchmarking programme standards with those of other HEIs, nationally and if possible internationally particularly with respect to final year projects, their quality and assessment.
- A record management system that maintains the integrity of the above processes should be in place.

5.3.5 Scheme of Assessment

The learning experience of a student in a module could be assessed in different ways, including continuous assessment (CA) and/or by a final assessment (FA). Among other methods, CA component could be based on,

- take-home assignments,
- in-class tests or quizzes,
- in class practical work,
- mid semester test, etc.

A small percentage of modules can include 100% for CA component or 100% for FA. The overall assessment of a module including CA and FA would be included in the module descriptor (Sample in Appendix C4).

The assessment of industrial training experience can have a CA component based on the 'daily diary' maintained by the student and certified on a regular basis by the establishment providing training. The FA component will be based on a report submitted by the student after the training period. The HEI will decide on the contributions of the two components CA and FA to determine the overall assessment of the module.

The final year project could be assessed according to a marking scheme prepared for the purpose along the guidelines specified in the module descriptor. There will be a CA component and a viva at the end of the project. The final assessment will depend on the direct contribution of the student to the effectiveness of the final output and outcome of the project, on whether learning outcomes are met and on the written report.

5.4 Programme Learning Outcomes for degree Accreditation

The skills, knowledge and attitudes that are expected from the graduates of a Four year Bachelors degree programme meeting the educational requirements towards Professional Membership of CSSL are based on the generic attributes outlined in section 4.2 of this manual. They are to be attained by a graduate in Computing and IT related area from a programme conducted by a HEI. Graduates are expected to successfully fit into society, satisfying the needs of employers and the industry.
For degree accreditation by CSSL, the programme outcomes required of a computing and IT professional graduate are based on Seoul Accord graduate attributes as given in section 4.2.

The HEI must demonstrate that the programme under review ensures the attainment of the knowledge profile and graduate attributes expected by CSSL by properly mapping the module learning outcomes to programme learning outcomes (MLOs to PLOs), (Appendix C3), and programme learning outcomes to programme educational objectives (PEOs to PLOs), (Appendix C2).

The curriculum and assessment must be focused on an outcome based approach (OBE) and assessment must be indicated in each module descriptor.

6.0 ACCREDITATION PROCEDURE

The accreditation procedure of CSSL includes several steps as indicated below.

a) CSSL receives application for a degree accreditation from HEI.
   - In the case of a programme of study that is to be accredited for the first time, the request should be made not less than six (6) months in advance.
   - In the case of a programme of study that has previously been accredited such request must be made not less than six (6) months before the accreditation lapses.

b) CSSL secretariat will do a preliminary check of the application and will send the accreditation manual to the HEI and requests HEI to submit documentation required for an accreditation visit.
c) HEI sends requested information and documents to CSSL.
d) CSSL secretariat acknowledges the documents received.
e) If CSSL secretariat is satisfied with the documentation, CSSL will inform HEI of 'Accreditation Visit details'.
   - If any additional information is required by CSSL, HEI will be requested to submit them within 2 weeks.
   - If the submitted information is still insufficient, further information may be requested within a week.
f) If necessary documents are received, CSSLAB will meet and appoint a 'Visiting Team' which is the Evaluation Panel (Panel) and fix a date for the visit.
g) After examining the documents, the Panel shall normally meet 4-5 weeks before the visit to share their initial findings and to identify any further information that may be necessary. HEI may be requested to submit additional information within a week.
h) The proposed visit schedule will be shared with the HEI and CSSL and HEI will prepare the final visit schedule.
i) The Panel will visit the HEI and conduct meetings, discussions and examine all necessary documents kept for inspection. The Panel can recommend anything appropriate to the HEI for improvement.
j) The visit would normally take 2.5 days.
k) At the end of the visit, the Panel will meet the Head of Department, all academic staff responsible for the programme and review the observed strengths and weaknesses of the programme.
l) Within 3(three) weeks after the visit, the Panel will prepare an initial report (Appendix E) of their findings to CSSLAB; the report will include the strengths and weaknesses of the programme. This is sent to CSSLAB and to HEI for information.
m) HEI shall respond to the report within 3 weeks of receiving the report.
n) Within 3 weeks, after considering the content of the HEI response to the observations of the visiting team, the Panel will prepare their Accreditation Report with recommendations and presents the report to CSSLAB.
o) CSSLAB will study the report including HEI responses, and make recommendations to the CSSL Council.
p) CSSL Council will take the final decision and inform the HEI accordingly.

The full cost of accreditation, including CSSL's fees, must be borne by the HEI who is requesting accreditation for the programme.

6.1 Application for Accreditation

An accreditation assessment is initiated only at the request of the HEI that conducts the programme of study concerned.

- Once a request is received, the CSSL informs the applicant HEI, of the documentation required for an accreditation visit to the applicant institution. This documentation includes information on the HEI, the programme of study, the staff, students, teaching-learning facilities, the curriculum (Appendix C1), mapping of PEOs to PLOs (Appendix C2), mapping of MLOs to PLOs (Appendix C3), module descriptors (Appendix C4), and quality management system (Appendix D). When there are more than one programme for accreditation, the Self Assessment Report as in Appendix B, should be one common report for all the programmes of the HEI and should include separate sections for individual study programme details.

- The completed documents should be sent to CSSL and CSSL will acknowledge receipt of the same. The documentation shall be sent in electronic form at least eight (8) weeks before the proposed date of the visit.

- If CSSL is satisfied with the information provided, details regarding the accreditation visit will be communicated to the HEI. Any additional information that may be requested by the CSSL should be provided by the HEI within two (2) weeks. If the information regarding the application for accreditation of the programme is considered to be inadequate, further information shall be requested from the institution before an accreditation visit is scheduled. If the requested information is not received within a further period of one (1) week, the application shall be considered to have been withdrawn.

- The 'Visiting Team' is the 'Panel' appointed by the CSSLAB. They would normally meet, electronically if desired, four to five (4-5) weeks before the accreditation visit to share their initial findings after examining the documents submitted by the HEI. This meeting also enables the Panel to identify matters necessary for detailed investigation during the accreditation visit and to identify any additional information that may be required for the evaluation process. The Panel will also plan a draft schedule for the visit and will prepare a short report with any issues to be addressed during the visit and if necessary to request for additional supporting information. This report will be sent to the HEI and information requested shall be received at least one (1) week before the accreditation visit.

- Along with the meeting report, a draft visit schedule detailing various sessions and activities are proposed for the visit. This schedule will be discussed and finalised with the HEI who will prepare final visit schedule with venue details for each session, lists of the names of persons at meetings, titles and affiliations of the senior leadership team, the academic staff and external participants who will be attending sessions with the panel. HEI will be advised to ensure that all sessions with the evaluation Panel be made a single location to minimise time being wasted moving around the HEI, as far as possible. There will also be visits to laboratories and student work places.

- A meeting of the Panel may be held on the evening before the date of the accreditation visit. This is for the Panel to make final preparations for the visit and to consider any additional supporting information submitted by the HEI and to prepare necessary questions for the different visit sessions.

6.2 Accreditation Visit

The Panel makes the accreditation visit as scheduled, to the HEI Section that offers the programme. The visit to accredit one programme will normally take two and a half (2.5) days. All documents

required for the degree accreditation process including electronic documents will be made available for the visiting team.

During the visit, the visiting team will carry out the following activities.

- Interviews with Head of the Institution and senior administrative officers of the HEI who are responsible for Computing and IT related programmes being assessed for accreditation, and the Heads of other Departments responsible for conducting classes for this particular programme of study.
- The Head of Department/Section or another academic in a similar position shall make a short presentation in about 5 minutes, on the degree programme being assessed.
- Interviews with members of the academic staff who are directly responsible for conduct of the theoretical and practical elements of the curriculum.
- Interviews with students.
- Interviews with academic and non-academic support staff to assess their competence in contributing positively to the academic programme.
- Discussions with employers of graduates, the alumni and any other stakeholders.
- A review of recent examination question papers and their standards determined using Blooms Taxonomy, laboratory instruction sheets, student laboratory reports, student assignments/reports, Industrial Training reports, Final Year Project reports, any papers published, student awards at national or international competitions, any other evidence of student performance for every module in the programme.
- Visits to computing facilities, laboratories and libraries to evaluate their adequacy and effectiveness.
- Visits to sports, recreation, canteen, hostel, etc facilities.

During the visit, the Panel also gets an opportunity to suggest enhancement activities and assess other factors such as intellectual atmosphere and morale in the department/section that offers the degree. The professional attitudes and dedication of staff and students will also be observed during the visit to the department.

At the end of the visit, the Panel will meet the Head of Department/Section and/or other Heads of Departments and all academic staff responsible for conducting the programme, to present their observations on the strengths and weaknesses of the programme.

6.2.1 Report of the Panel

The Panel shall prepare a report of their findings regarding the programme of study and present it to the CSSLAB and HEI within three (3) weeks after the date of the visit (Appendix E). This report will include observed strengths and weaknesses of the programme, areas in which it conforms to and deviates from the accreditation criteria, along with recommendations on matters of concern. This report will not include any recommendations to CSSLAB on accreditation of the degree.

HEI is expected to respond to the Panel comments. This is to ensure accuracy and completeness. The response of the HEI should be received by the CSSLAB Secretariat within a period of three (3) weeks.

The Panel will then prepare the Accreditation Report, (Appendix F), which includes the recommendations to the CSSLAB. The accreditation report along with an updated version of Panel Report, Appendix E, will then be submitted to CSSLAB within the next 3 weeks.

6.2.2 Accreditation Decision

The CSSLAB shall make a recommendation on accreditation to the CSSL Council after considering the documentation provided by the HEI Section concerned, the Panel Report (Appendix E), any other necessary correspondence and the Accreditation Report (Appendix F).

The CSSLAB will consider the recommendations of the Panel and makes their decision after extensive discussion. CSSLAB will then make a recommendation on the accreditation to the CSSL Council.

The CSSLAB recommendation may be one of the following:

- To grant **full accreditation** for a period of five (5) years.
- Request the HEI to meet specific requirements within a period of not more than 6 months and submit a report showing that the requirements have been fulfilled. If CSSLAB accepts the report, it may then recommend **full accreditation.**
- To grant **provisional accreditation** for a new programme or for a programme that has gone through major changes to the curriculum after obtaining accreditation.
- To **decline or terminate accreditation**, depending on whether it is a new programme or an already accredited programme.

Based on the recommendation made by the CSSLAB, the CSSL Council shall make a decision on accreditation of the programme of study concerned. Accordingly, CSSL decision will be conveyed to the HEI with clear reasons.

If CSSLAB or Council decides to change the respective recommendations of either the Panel or the CSSLAB as the case may be, then the reasons for such changes are kept on record.

When a programme of study is offered at different locations and/or through different modes of delivery, accreditation status will apply only to the location and/or mode of delivery that has been reviewed.

6.3 Formal Review

If the decision by the CSSL is to terminate the accreditation of a programme or to decline accreditation to an unaccredited programme, the HEI may request to the President of CSSL for a formal review of its decision. This request is made after receiving the decision of the CSSL. The CSSL will then instruct the CSSLAB to conduct a second visit. This will be carried out at a suitable time considering the time needed to consider all the issues raised by the first Panel. The same accreditation procedure will be followed by the new Panel which will report to the CSSLAB with a fresh recommendation to the CSSL.

6.3.1 Appeals

The HEI may appeal against a decision to decline or terminate accreditation. The appeal must be made in writing to the President of CSSL, within two weeks of receiving the decision, and must state the reasons for the appeal.

The CSSL Council may appoint an Appeal Board comprising one senior CSSL Member and two persons of repute outside the CSSL, to consider the appeal. Following the report of Appeal Board, the Council shall take a decision, which will be final.

6.4 Informal Evaluation or Visit

An HEI may request the CSSL for an informal assessment of a proposal for a new programme of study at an appropriate time during its development stage. The CSSLAB may arrange an informal visit by a suitable team for the purpose of providing comments and advice to the HEI with respect to the programme. However, no assurance will be given by the CSSLAB as to the eventual accreditation of the programme. The Panel will present a report to the HEI, and a copy of the report will be forwarded to CSSLAB for information. The cost of such evaluation / visit shall be borne by the HEI concerned.

6.5 Publication of Accreditation Status

The CSSL will publish a list of accredited programmes of study, together with their effective dates. The list maintained by the CSSL includes only those programmes which have received full accreditation and provisional accreditation.

The records and deliberations of the CSSLAB and the CSSL concerning accreditation of a programme of study shall be maintained confidential.

7.0 REFERENCES

Computer Society of Sri Lanka gratefully acknowledges the information contents taken from the following sources:-

- Institution of Engineers Sri Lanka
- Seoul Accord
- British Computer Society
- Australian Computer Society
- Institution of Engineering and Technology, UK

APPENDICIES

APPENDIX A: GRADUATE ATTRIBUTES

		Differentiating Characteristic	… for Seoul Accord (Computing Professional) Graduate	… for Computing Technologist Graduate	… for Computing Technician Graduate

1	**Academic Education**	Educational depth and breadth	Completion of an accredited programme of study designed to prepare graduates as computing professionals	Completion of a programme of study typically of shorter duration than for professional preparation	Completion of a programme of study typically of shorter duration than for technologist preparation
2	**Knowledge for Solving Computing Problems**	Breadth and depth of education and type of knowledge, both theoretical and practical	Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements	Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to defined and applied computing procedures, processes, systems, or methodologies	Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to a wide variety of practical procedures and practices
3	**Problem Analysis**	Complexity of analysis	Identify and solve *complex* computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines	Identify, formulate, research literature, and solve *broadly-defined* computing problems reaching substantiated conclusions using analytical tools appropriate to the discipline or area of specialization	Identify and solve *well-defined* computing problems reaching substantiated conclusions using codified methods of analysis specific to the field of activity
4	**Design/Development of Solutions**	Breadth and uniqueness of computing problems, i.e., the extent to which problems are original and to which solutions have previously been identified or codified	Design and evaluate solutions for *complex* computing problems, and design and evaluate systems, components, or processes that meet specified needs	Design solutions for *broadly-defined* computing technology problems, and contribute to the design of systems, components, or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and	Design solutions for *well-defined* computing problems, and assist with the design of systems, components, or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations

				environmental considerations	
5	**Modern Tool Usage**	Level and appropriateness of the tool to the type of activities performed	Create, select, or adapt and then apply appropriate techniques, resources, and modern computing tools to *complex* computing activities, with an understanding of the limitations	Select and apply appropriate techniques, resources, and modern computing tools to *broadly-defined* computing activities, with an understanding of the limitations	Apply appropriate techniques, resources, and modern computing tools to *well-defined* computing activities, with an awareness of the limitations
6	**Individual and Team Work**	Role in, and diversity of, the team	Function effectively as an individual and as a member or leader of a team in multi-disciplinary settings	Function effectively as an individual and as a member or leader in diverse technical teams	Function effectively as an individual and as a member in diverse technical teams
7	**Communication**	Level of communication according to type of activities performed	Communicate effectively with the computing community about *complex* computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions	Communicate effectively with the computing community and with society at large about *broadly-defined* computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions	Communicate effectively with the computing community and with society at large about *well-defined* computing activities by being able to comprehend the work of others, document one's own work, and give and understand clear instructions
8	**Computing Professionalism and Society**	No differentiation in this characteristic except level of practice	Understand and assess societal, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice	Understand and assess societal, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to computing	Understand and assess societal, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to computing technician practice

				technologist practice	
9	**Ethics**	No differentiation in this characteristic except level of practice	Understand and commit to professional ethics, responsibilities, and norms of professional computing practice	Understand and commit to professional ethics, responsibilities, and norms of computing technologist practice	Understand and commit to professional ethics, responsibilities, and norms of computing technician practice
10	**Life-long Learning**	No differentiation in this characteristic except level of practice	Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional	Recognize the need, and have the ability, to engage in independent learning for continual development as a computing technologist	Recognize the need, and have the ability, to engage in independent learning for continual development as a computing technician

APPENDIX B - SELF ASSESMENT REPORT

B1: General Information of HEI

HEI	
Dept/Division	
Programmes	'a' -
	'b' -
	'c' -
	'd' -
Duration of Programmes	'a' – 'b' – 'c' – 'd' -

B2: Programmes

How many years have the programmes been running?	'a'
	'b'
	'c'
	'd'
When was the curricula last revised?	

B2.1 Academic Staff details responsible for programme 'a'

Table: B2.1

Category Full Time (FT) Part Time (PT) Visiting	Position	No:	Full Time Equivalent*
FT	Professors	1	1
	Senior Lecturers		
	Lecturers		
	Asst Lecturers		
	Instructors/Demonstrators		
PT [Contract]*	Professors		
	Senior Lecturers		
	Lecturers		
	Asst Lecturers		
	Instructors/Demonstrators		
Visiting	Professors		0
	Senior Lecturers		0
	Lecturers		0
	Asst Lecturers		0
	Instructors/Demonstrators		
Total Full Time Equivalent			

*** working half day/week, FTE = 0.1; working 1 day/week , FTE = 0.2; working 5 days/week, FTE = 1**

 # Include Table B2.1 for Programmes 'b', 'c', 'd'.

**** Provide CV's of all Academic staff as an appendix.**

B2.2 Student enrolment to programmes:

Table: B2(I) - Enrolment with Local A/L

	Student number enrolled (last enrollment)	Maximum Z score or equivalent, of the students enrolled	Minimum Z score or equivalent , of the students enrolled
Programme 'a'			
Programme 'b'			
Programme 'c'			
Programme 'd'			

Table: B2(II) - Enrolment with London A/L

	Student number enrolled (last enrollment)	Highest Results	Lowest Results
Programme 'a'			
Programme 'b'			
Programme 'c'			
Programme 'd'			

B2.3 Curriculum plan of programme

Table: B3

Table B3 is a template to give the list of PEOs and PLOs related to the programme based on which the curriculum is prepared.

Programme Educational Objectives (PEOs)	**Programme Learning Outcomes (PLOs)**
1. **2.** **3.**	**1.** **2.** **3.** **4.** **5.** **6.** **7.** **8.** **9.** **10.**

Note:

(a) Provide mapping of PEOs to PLOs using the sample template given in Appendix C2.
(b) Provide Module Titles of the curriculum in Appendix C1 and module descriptors as in Appendix C4. [Sample module descriptor included in Appendix C4].
(c) Provide mapping of MLOs to PLOs using sample given in Appendix C3 or in any other form.

B2.4: Projects

Table B2.4

	Projects other than FYP	**Final Year Project**
Module Code		
Academic Credits		

B2.5: Industrial Training

Table B2.5

	Academic Credits	**Industrial Training Places**	**Assessment of Industrial Training**
Module Code			

B2.6: Teaching – Learning Process

Table B2.6

Methods of delivery by Academic Staff	**Methods of independent learning by Students**

B2.7: Assessment of Laboratory work

……
……
……
……

B2.8: Academic Credit Allocations

Table 1 – Academic Credit requirements for degree accreditation

Academic Credit Requirement			**Minimum Academic Credits**
A	Computing / IT	A1. Core Computing/IT Modules	
		A2. Supplementary Computing/IT Modules	
B	Non-Computing/IT	Mathematics	
		Management, Commerce and Accounting	
		Professional Practice	
		English and Communication skills	
C	Industrial Training		
D	Final Year Project		
	Total Minimum Academic Credits (not total of above)		

Plus details of A1, A2, B, C and D with module titles must be included.

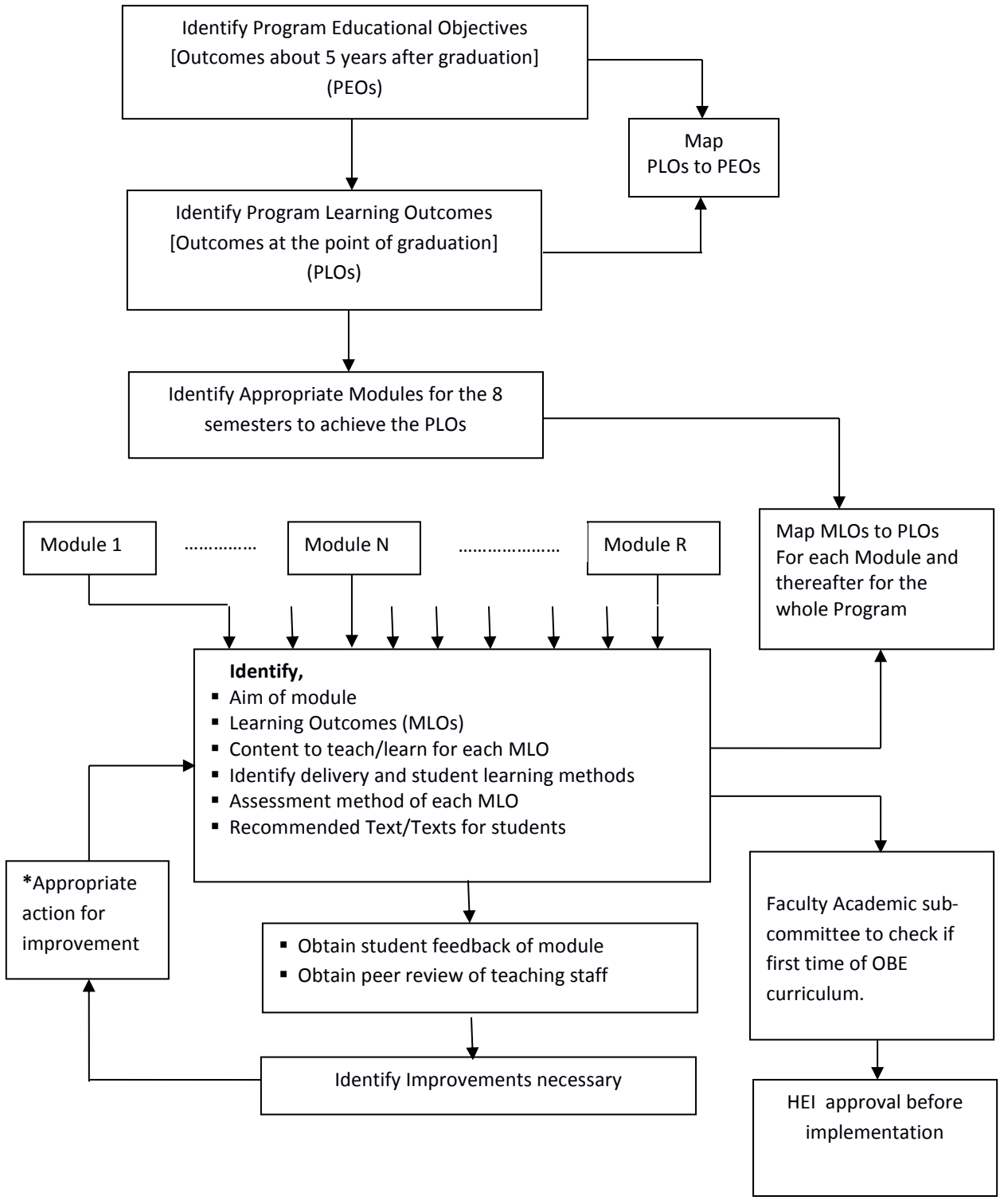
B2.9: External Examiner / External Examiners for the Program

B2.10: Any other useful information

a) Feedback from
- Student
- Peer Review
- Employers / industrialists
- QA Unit of the HEI/Faculty
- Curriculum and Evaluation Unit of HEI/Faculty

(b) Any improvements introduced after feedback

APPENDIX C – OUTCOME BASED SYSTEM
[CURRICULUM DESIGN OF THE PROGRAMME - OBE SYSTEM]



* Stakeholder suggestions are also to be considered along with student feedback and peer review for used for improvement.

 # useful web site on PEOs:-
https://www.umassd.edu/engineering/cis/undergraduate/programeducationalobjectives/

Appendix C1 **Programme Curriculum** **4 year degree**

Note: You may use any other format to give the programme curriculum.

Module Code	Module Title	# Category (C/ E /O)	DLH			NLH	Academic Credits		* Evaluations	
			Lect.	Practs.	Other		GPA	NGPA	CA	FA
Year 1										
Semester 1										
Semester 2										
Total Academic Credits for Year 1										
Year 2										
Semester 3										
Semester 4										
Total Academic Credits for Year 2										
Year 3										
Semester 5										
Semester 6										
Total Academic Credits for Year 3										
Year 4										
Semester 7										
Semester 8										
Total Academic Credits for Year 4										
Total Academic Credits for the 4 Year Programme										

Note: # Category: C – Core; E – Elective; O – Optional
* Evaluations: CA – Continuous Assessment; FA – Final Assessment

APPENDIX C2: MAPPING PEOs to PLOs

Programme Educational Objectives (PEOs)

PEO 1: …….

PEO 2: …….

PEO 3: …….

Programme Learning Outcomes (PLOs)

PLO 1: ……

PLO 2: ……

.
.

MAPPING: Sample of three PEOs mapped to ten PLOs

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
PEO 1	✓				✓					✓
PEO 2	✓		✓			✓			✓	
PEO 3		✓			✓			✓		✓

APPENDIX C3: MAPPING MLOs to PLOs

(Insert H, M, L or leave blank appropriately - H for high; M for medium and L for low contribution)

(a) N modules of a 4 year programme mapped to ten PLOs: Full Programme

Module Code	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10
1	H	M	L	M	L	M		L	L	L
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
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N										
#Note 1 % Contribution to each PLO on full programme										
#Note 2 FULL PROGRAMME										

#Note 1:
To estimate the % contribution from each PLO of full programme, **you may use any reasonable method.**
eg: For each PLO, you can take H = 5; M = 3; L = 1;
% Contribution for each PLO = Y = [Σ(H's+M's+L's)/(5N)]*100

#Note 2:
For each PLO of full programme, identify High, Medium or Low, from the % contribution.
If Y > 65% take as H
If 64% < Y < 10% take as M
If Y < 10% take as L

APPENDIX C4: MODULE DESCRIPTOR – SAMPLE

<table>
<tr><td>Module Code</td><td>CS 2xxx</td><td>Module Title</td><td colspan="4">Data Structures and Algorithms</td></tr>
<tr><td>Credits</td><td>2.5</td><td rowspan="2">Hours/Week</td><td>Lectures</td><td>2</td><td rowspan="2">Pre – requisites</td><td rowspan="2">CS1xxx</td></tr>
<tr><td>GPA/NGPA</td><td>GPA</td><td>Lab/Assignments</td><td>2/2</td></tr>
<tr><td colspan="7"><u>Module Learning Outcomes</u>
After completing this module, students would be able to,
1. analyse the complexity of basic algorithms
2. implement and use common data structures
3. select appropriate data structures and algorithms for a given situation
4. apply basic algorithm design techniques for a given situation.</td></tr>
<tr><td colspan="7"><u>Outline Syllabus</u>

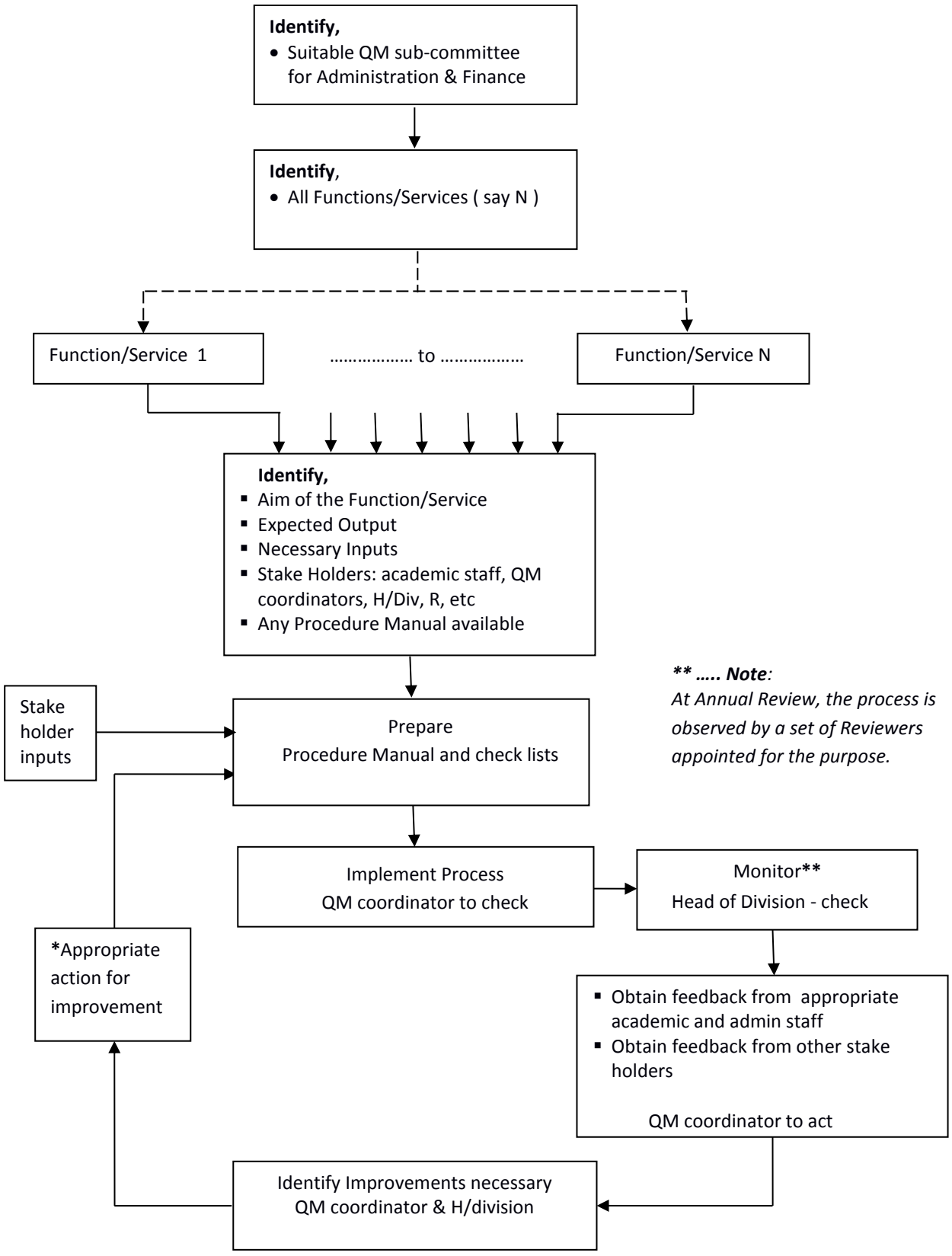
• Complexity analysis of algorithms
• Recursion
• Searching
• Sorting
○ Basic algorithm design techniques: Divide-and-conquer, Greedy approach, Dynamic Programmeming
○ Basic data structures and operations on them: Arrays, Linked lists, Queues, Stacks, Sets, Trees, Hash tables, Graphs
• Introduction to NP-Completeness</td></tr>
<tr><td colspan="7">Practical Work: 1. ……
2. ……
3. ……
4. ……..

Tutorial Work: x classes [1 hour per class]</td></tr>
<tr><td colspan="7">Assessment:

Continuous Assessment (CA) ….40%
a Practical work 20%
b Quizzes/Take home assignments/…. on LO1 and LO3 20%

Final Assessment (FA) on LO1, LO2, LO3, LO4 ……60% 60%</td></tr>
<tr><td colspan="7">Recommended Books
1. “Title of book” by “Name of Author”
Publisher: xxxxxxxxxx, xxxx year ISBN: xxxxxxxxxxxxxxx</td></tr>
<tr><td colspan="7">2. “Title of book” by “Name of Author”
Publisher: xxxxxxxxxx xxxx year ISBN: xxxxxxxxxxxxxxx</td></tr>
</table>

APPENDIX D – QUALITY MANAGEMENT SYSTEM



APPENDIX E - PANEL REPORT

Section 1: Programme Learning Outcomes

	Acceptable for Accreditation			Strengths	Weaknesses	Comments
Graduate Attributes	Above A	Just Right B	Below C			
1. Academic Education: Completed the programme of study						
2. Knowledge for solving computing problems: Able to apply knowledge on computing and domain knowledge to develop computer models for problems						
3. Problem analysis: Identify and solve complex problems						
4. Design / Development: Design and develop systems to meet specified needs						
5. Modern Tool Usage:						
6. Individual and Team Work: Able to effectively work as an individual or as a member of a team						
7. Communication: Able to Communicate effectively with the computing community						
8. Computing Professionalism and Society: Able to work with an understanding of the society, health, safety, legal and cultural issues						
9. Ethics: Able to work with an understanding of professional ethics and norms of computing practice.						
10. Life-long Learning: Ability to engage in independent learning for continuous development						

Section 2: Academic Programme

	Acceptable for Accreditation			Strengths	Weaknesses	Comments
Programme requirements	Above A	Just Right B	Below C			
1. Programme caters to industry needs						
2. Modules are suitably titled						
3. PEOs are well mapped to PLOs of Seoul Accord						
4. MLOs are well mapped to PLOs of Seoul Accord						
5. Core Computing & IT modules satisfy credit requirements						
6. Supplementary Computing/IT core modules satisfy credit requirements						
7. Non-Computing / IT modules satisfy credit requirements						
8. Industrial Training module is at least 5 credits and all MLOs are assessed.						
9. Final Year Project is at least 6 academic credits.						
10. Programme includes at least 120 credits						
11. All Credit requirements are satisfactorily met.						
12. Students are given clear guidance on all aspects of conduct of the project, targets, format of the project report and the method of assessment						
13. Project must be passed without concessions						
14. Project reports conform to the guide lines given.						

15. If the project is done as a group, individual contribution of each student is assessed against the stated learning outcomes						
16. Modules are well delivered with sufficient independent learning material						
17. Continuous Assessment (CA) carried out regularly in class and as take home assignments						
18. Sufficient Independent work is carried out regularly by students.						
19. Sufficient number of lab work is done in each semester						
20. Lab reports are well prepared						
21. End semester Final Assessment (FA) is prepared and moderated before the exam						
22. Student work load is reasonable						
23. QM processes are effective.						
24. Feedback from stake holders are used for quality improvement						
25. Soft skills are developed.						

Section 3: Academic Staff and Students

	Acceptable for Accreditation			Strengths	Weaknesses	Comments
Academic Staff and Student strengths	Above A	Just Right B	Below C			
1. The full time academic staff devoted for this programme is adequate.						
2. There is sufficient academic staff with doctoral degrees in computing or related areas devoted for this programme.						
3. There is sufficient academic staff with other post-graduate degrees in computing or related areas devoted for this programme.						
4. Full Time Equivalent value of academic staff is satisfactory.						
5. There is sufficient number of support staff for the student academic work.						
6. Students have acquired confidence in the use of necessary tools.						
7. Students are suitably qualified at entry point to follow the programme.						
8. Students are fluent in the use of English language in speaking and writing.						
9. There is a healthy staff-student relationship.						
10. Staff-student ratio is satisfactory.						

Section 4: Teaching Facilitates

	Acceptable for Accreditation			Strengths	Weaknesses	Comments
Learning Environment	Above A	Just Right B	Below C			
1. Class rooms well equipped with multi-media facilities.						
2. Laboratories include sufficient number of computers with acceptable specifications.						
3. Necessary software freely accessible for students and staff.						
4. Special software packages necessary for student project work available.						
5. Hands-on experience in computer and IT related activities provided for students in Labs						
6. Students have sufficient free space for independent study activities and project activities.						

Section 5: Quality Management System

	Acceptable for Accreditation			Strengths	Weaknesses	Comments
Quality Assurance	Above A	Just Right B	Below C			
1. HEI has plans to attract qualified and experienced staff to take up leadership of the academic programmes.						
2. HEI has plans to attract and retain qualified academic staff to conduct the programmes.						
3. Assessment methods of individual modules are documented.						
4. Academic Credit value and Assessment of Industrial Training module are satisfactory						
5. Criteria for student progression from year 1 to year 4 are documented and practiced.						
6. Process of written examination question paper setting and moderation is documented and practiced.						
7. Examination Question Papers are of a standard suitable for an honours degree programme.						
8. Final Year individual Project: clear instructions are given to students on all aspects of conduct of project, targets, format of the project report and assessment.						
9. When projects are carried out in groups, the contribution of each student is evaluated against the MLOs.						
10. Project reports conform to given instructions.						
11. Academic Credits allocated to the Project Module is satisfactory.						

APPENDIX F: ACCREDITATION REPORT

1. General Information

Higher Educational Institute: ……..
……..
Programme for Accreditation:
……..
……

2. Evaluation Panel Members

Chairman: ……..
Members:
……
……
……
……

3. Accreditation Criteria and Panel Recommendations

Panel recommendations will be achieved through discussion and consensus. This is during a private meeting of the Panel based on,

a) Panel observations included in Appendix E,
b) HEI responses to the panel concerns, if any.

- If at least 80% of all sections of Accreditation Criteria of Appendix E score A or B, and if all sections the Programme Learning Outcomes receive A or B, the programme meets all accreditation criteria. The decision would be "Full Accreditation for 5 years".

- If more than 20% of the accreditation criteria score C or any in Programme Learning Outcomes, the programme will normally be considered as not meeting accreditation criteria. The decision would be "Not Accredited".

- If a new programme scores more than 80% A or B for nearly all sections of accreditation criteria, the panel decision would be "Provisional Accreditation". A new programme is one where the first batch of graduates have less than one year work experience or a programme that has gone through major curriculum revision after obtaining accreditation.

Panel report will be signed by Chairman and all members of the Evaluation Panel.