National School of Business Management

Faculty of Computing

Award Handbook

BSc (Hons) in Computer Science

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1. Welcome to the Faculty

Welcome to the Faculty of Computing at National School of Business Management.

NSBM is a dynamic young organization offering innovative educational products to cater for the growth of fast changing business and industrial economies. Let me congratulate you in becoming part of this dynamic organization.

Your course of study will be up to date and relevant, will be serviced by well qualified staff, and will also be geared to preparing you for life and employment after university. NSBM Graduate profile and student charter aims to help all of our students achieve what they want to in life. As one of our students we expect you to work hard, to set high standards for yourself. To help you to succeed you will have access to excellent staff and facilities, and also to a range of student support services to help deal with your particular needs. Of course, to do this academic, administration and technical staff that you come across as part of your studies will readily advise and support you. Your part is to take your study seriously, to ensure that you set-aside appropriate time for your study, and to make full use of the diverse range of learning opportunities – both in class and directed study outside of classes – provided by your course. It is important to us that you are successful and that you go on to be a good ambassador for the university.

Inevitably at the start of all study programmes you will be bombarded with a host of well-intentioned information. Some of that information is immediately important to start your studies and make sure that you are in the right place at the right time. Some information you will need later in your course, whilst other information is about the services the University offers generally which you may need to make reference to in the future. We suggest that you download the **NSBM student handbook** and keep it for reference and familiarize yourself with the range of information it contains. This should be the first document of your own e-archive - get into the habit of downloading essential documents like module descriptors and module handbooks when the course starts.

You are now part of the NSBM family and we look forward to working with you to help you to succeed as an NSBM Graduate.

Very best wishes,
Dean
Faculty of Computing

2. Useful Contacts and Resources

2.1 Academic Contacts

Programme Director: Viraj Edirisinghe (virajd@nsbm.lk)

Head of Computing School: Chaminda Rathnayake (chaminda@nsbm.lk)

2.2 Administrative Contacts

Programme Coordinator: Devika Weerawardana (devika@nsbm.lk)

Carrier Guidance Advisor: Chaminda Wijesinghe (chamindaw@nsbm.lk)

Programme Office: Pondeepa Udari (udari@nsbm.lk)

Examination Unit: Pamoda Piumini (pamoda@nsbm.lk)

Library: Mr. B K Jayasinghe

2.3 Useful Internet Resources

NSBM website can be found at: http://www.nsbm.lk. Even though this site is addressed to public, you can find important information related to NSBM, school of computing and your award on this site.

NSBM uses Moodle as an online learning environment, and information on modules on which you are enrolled can be accessed from http://lms.nsbm.lk Note: you can only get access to those modules that you are studying – if you cannot gain access to material, it may be that you are not correctly enrolled on the module – make sure you let your module tutor or programme administrator know.

You will also be able to access your Moodle award or subject community which will provide award/subject information and updates including e-copies of this award handbook, extracurricular talks and events relevant to your subject area and award discussion forums.

The Moodle Learning Management System and other useful online systems can be found at: http://intranet.nsbm.lk

3. What are the aims of the award?

Computer Scienceaddresses, designing and implementing software, devising new ways to use computers, and devising effective ways to solve computing problems.

The aims of the degree programme in Computer Science(CS) are to provide the students with:

- Technical understanding of computer science Body ofKnowledge.
- Familiarity with common CS themes and principles such as abstraction, complexity, and evolutionary change, and a set of general principles, such as sharing a common resource, security, and concurrency.
- Appreciation of the interplay between theory and practice
- System-level perspective; ability to think at multiple levels of detail andabstraction.
- Problem solving skills
- Project experience
- Commitment to life-long learning
- Commitment to professional responsibility, recognizing the social, legal, ethical, and cultural issues inherent in the discipline of computing.
- Communication and organizational skills
- Awareness of the broad applicability of computing, ranging from embedded micro-sensors to high-performance clusters and distributed clouds.
- Appreciation of domain-specific knowledge

Graduates join industry as entry level professionals in the field of computing and related disciplines as Computing solution Analysts, Designers, Architects, Developers, testing and quality assurance specialists, computing system administrators, business/technology analysts and systems integrators, and software developers.

Graduates who study the four-year degree, can enter the employment market in various sectors. Main employment sectors include:

- Computing industry; state and private, organizations those provide ICT solutions to public and private sectors.
- Large enterprises; Banking, Insurance, Telecommunications, manufacturing, retail and digital services industries
- Education industry
- Government and defence
- Self employment (Entrepreneurs/Computing service providers)

4. What are the Computer Science Graduate Attributes?

Computer Science Graduates should be able to demonstrate the following qualities.

2.1 **Technical understanding of computer science:** Graduates should have a mastery of computer science as described by the core of the Body of Knowledge.

2.2 **Familiarity with common themes and principles**: Graduates need understanding of a number of recurring themes, such as abstraction, complexity, and evolutionary change, and a set of general principles, such as sharing a common resource, security, and concurrency. Graduates should recognize that these themes and principles have broad application to the field of computer science and should not consider them as relevant only to the domains in which they were introduced.

2.3 **Appreciation of the interplay between theory and practice**: A fundamental aspect of computer science is understanding the interplay between theory and practice and the essential links between them. Graduates of a computer science program need to understand how theory and practice influence each other.

2.4 **System-level perspective:** Graduates of a computer science program need to think at multiple levels of detail and abstraction. This understanding should transcend the implementation details of the various components to encompass an appreciation for the structure of computer systems and the processes involved in their construction and analysis. They need to recognize the context in which a computer system may function, including its interactions with people and the physical world.

2.5 **Problem solving skills**: Graduates need to understand how to apply the knowledge they have gained to solve real problems, not just write code and move bits. They should to be able to design and improve a system based on a quantitative and qualitative assessment of its functionality, usability and performance. They should realize that there are multiple solutions to a given problem and that selecting among them is not a purely technical activity, as these solutions will have a real impact on people's lives. Graduates also should be able to communicate their solution to others, including why and how a solution solves the problem and what assumptions were made.

2.6 **Project experience**: To ensure that graduates can successfully apply the knowledge they have gained, all graduates of computer science programs should have been involved in at least one substantial project. In most cases, this experience will be a software development project, but other experiences are also appropriate in particular circumstances. Such projects should challenge students by being integrative, requiring evaluation of potential solutions, and requiring work on a larger scale than typical course projects. Students should have opportunities to develop their interpersonal communication skills as part of their project experience.

2.7 **Commitment to life-long learning:** Graduates should realize that the computing field advances at a rapid pace, and graduates must possess a solid foundation that allows and encourages them to maintain relevant skills as the field evolves. Specific languages and technology platforms change over time. Therefore, graduates need to realize that they must continue to learn and adapt their skills throughout their careers. To develop this ability, students should be exposed to multiple programming languages, tools, paradigms, and technologies as well as the fundamental underlying principles throughout their education. In addition, graduates are now expected to manage their own career development and advancement. Graduates seeking career advancement often engage in professional development activities, such as certifications, management training, or obtaining domain-specific knowledge.

2.8 **Commitment to professional responsibility:** Graduates should recognize the social, legal, ethical, and cultural issues inherent in the discipline of computing. They must further recognize that social, legal, and ethical standards vary internationally. They should be knowledgeable about the interplay of ethical issues, technical problems, and aesthetic values that play an important part in the development of computing systems. Practitioners must understand their individual and collective

responsibility and the possible consequences of failure. They must understand their own limitations as well as the limitations of their tools.

2.9 **Communication and organizational skills**: Graduates should have the ability to make effective presentations to a range of audiences about technical problems and their solutions. This may involve face-to-face, written, or electronic communication. They should be prepared to work effectively as members of teams. Graduates should be able to manage their own learning and development, including managing time, priorities, and progress.

2.10 **Awareness of the broad applicability of computing**: Platforms range from embedded micro-sensors to high-performance clusters and distributed clouds. Computer applications impact nearly every aspect of modern life. Graduates should understand the full range of opportunities available in computing.

2.11 **Appreciation of domain-specific knowledge**: Graduates should understand that computing interacts with many different domains. Solutions to many problems require both computing skills and domain knowledge. Therefore, graduates need to be able to communicate with, and learn from, experts from different domains throughout their careers.

5. What are the specific award learning outcomes?

At the end of the study programme, students should be able to:

3.1 **Knowledge & Understanding:** Demonstrate a systematic understanding of computing concepts and principles. Show mastery of the core Computer Science body of knowledge and awareness of the broad applicability of computing.

3.2 **Learning:** Develop lines of argument and evaluate possible approaches, tools, techniques, platforms and solutions based on knowledge of computing principles and practices, and demonstrate understanding of the uncertainty, ambiguity and limitations of this knowledge.

3.3 **Enquiry:** Ethically gather information pertaining to computing problems, possible solutions, and the success of these solutions. Find, critically evaluate, manage, apply, and understand information from a range of sources, acknowledging the cultural, ethical, economic, legal, and social issues surrounding the use of such information.

3.4 **Analysis:** Critically discuss current research in Computing, and evaluate arguments, assumptions, abstract concepts and data (that may be incomplete) to draw conclusions.

3.5 **Problem Solving:** Design appropriate solutions in one or more application domains using Computing knowledge and skills that integrate ethical, social, legal, and economic concerns. Reconcile conflicting project objectives, finding acceptable compromises within the limitations of cost, time, knowledge, existing systems, and organizations.

3.6 **Communication:** Communicate ideas, problems and solutions to both specialist and non-specialist audiences in a variety of forms, including, but not limited to: written academic reports; verbal presentations; documentation in support of the development of computing solutions.

3.7 **Application:** Demonstrate an understanding of and apply appropriate theories, models, and techniques that provide a basis for problem identification and analysis, design, development, and documentation solutions to substantial computing problems.

3.8 **Reflection:** Critically evaluate your performance as an academic and a computing professional, considering both process and the end result. Plan how to make your performance (process and end result) more relevant and more effective.

3.9 **Professional Practice:** Work both individually and as part of a team to develop and deliver substantial Computing Solutions. Demonstrate an understanding and appreciation of the importance of negotiation, effective work habits, leadership, and good communication with stakeholders. Demonstrate positive attitudes and social responsibility. Exercise initiative, personal responsibility and accountability and undertake further training and develop additional skills as required by the industry.

6. How is the award structured?

The award is designed to be taken on a full-time basis even though, during part of years 3 and full year 4, all learning sessions are held after-hours and weekends. This is to encourage you to continue with any potential employment opportunities after the industry placement that starts from the year 3.

BSc (Hons) in Computer Science is a 4 year study programme with total credit weighting of 120. Each year students complete 30 credits by following 10 subject modules, each weighing 3 credits, except for the last 2 years where students undertake an Industry placement worth 8 credits in Year 3 and an Award project worth 6 credits in Year 4.

6.1 Year 1 /Level 1 (SLQL 3)

In Year 1, students follow a curricula consisting of eight Computer Science core modules and two foundation (elective) modules. The two Foundation modules are to provide students from diverse backgrounds and social classes with the required foundational knowledge and skills in computing and professional/academic development. Table 1 below, specifies the subject modules students follow at this level. This level of study lays a strong computing foundation to the students on which they develop more specialised learning related to computer science and application specialties.

Table 1 – Level 1 modules for all Computer Science award.

Term	Module Code	Module Name	Credit Value
1 (18 weeks)	MA101.3	Mathematics I (Core)	3
	CS101.3	Introduction to Computer Science(Foundation/Elective)	3
	CS102.3	Programming in C (Core)	3
	CS103.3	Professional Development (Foundation/Elective)	3
2 (10 weeks)	SE101.3	Object Oriented Programming with Java (Core)	3
	CS105.3	Database Management Systems (Core)	3
3 (18 weeks)	CS106.3	Algorithms and Data structures (Core)	3
	CS104.3	Computer Architecture (Core)	3
	CN101.3	Data communications and networks (Core)	3
	SE102.3	Web Based Application Development (Core)	3

Note: Please refer module descriptors for module learning outcomes (and mappings to programme learning outcomes), detailed subject content and teaching & assessment strategies.

6.2 Year 2 /Level 2 (SLQL 4)

In Year 2, students continue to acquire core Computer Science body of knowledge by following 10 core modules. Table 2 below specifies the modules for level 2. The waiting of each module is still 3 credits and the students take 10 modules at this level during the 3 terms of the fixed academic calendar of NSBM, with a consistent student workload across the academic year.

Table 2 – Level 2 modules for all Computer Science award.

Term	Module Code	Module Name	Credit Value
1	CN201.3	Computer Networks (Core)	3

(18 weeks)	SE201.3	Systems Analysis and Design (Core)	3
	CS201.3	Operating Systems (Core)	3
	MA201.3	Mathematics II (Core)	3
2 (10 weeks)	SE202.3	Introduction to Software Engineering (Core)	3
	SE204.3	Development of Enterprise Applications I (Core)	3
3 (18 weeks)	CS202.3	Systems Fundamentals (Core)	3
	CS203.3	Algorithms and Complexity (Core)	3
	SE205.3	Software Architecture (Core)	3
	SE206.3	Human Computer Interaction (Core)	3

Note: Please refer module descriptors for further module specific details.

6.3 Year 3 /Level 3 (SLQL 5)

In Year 3, students continue to follow 6 core modules and the compulsory internship module that weigh 8 credits. Students are also offered 4 elective modules and they should choose a minimum of 2 modules to cover the credit requirement for Level 3.All elective modules will not be offered in a given term. Table 3 below lists down the modules available at level 3.

Table 3 – Level 3 modules for the Computer Science award.

Module Code	Module Name	Credit Value	Type
CS303.3	Computational Theory	3	Core
CS306.3	Information Assurance and Security	3	Core
MA301.3	Mathematics III	3	Core
CS305.3	Programming Languages and Compiler Design	3	Core
SE307.3	Social Issues and Professional Practice	3	Core
CS304.3	Advanced Database Management Systems	3	Core
SE305.8	Internship	8	Compulsory
CS302.3	Cryptography	3	Elective
SE301.3	SW Process Management	3	Elective
SE303.3	Mobile Application Development	3	Elective
CN302.3	Wireless Technologies and Network Programming	3	Elective

Notes –
Please refer module descriptors for further module related details.

In year 3, Students undertake internship in an 18 week term along with one to two subjects delivered after hours and/or during the weekends. In the remaining two terms of Level 3, students continue to follow the remaining 6 to 7 subjects.

6.4 Year 4 /Level 4 (SLQL 6)

In Year 4, students follow 3 Computer Science core modules and the award specific project that weighs 6 credits and continue throughout the year. To satisfy the credit requirement of Level 4, students have to undertake minimum of 5additional elective modules from a total of 9 offered modules though all elective modules will not be offered in a given term. Table 4 specifies the modules available for level 4. Individual module descriptors provide detailed information on each module.

Table 4 – Level 4 modules for all Engineering awards within the programme.

Module Code	Module Name	Credit Value	Type
BS402.3	Entrepreneurship	3	Elective
BS401.3	Business Policy and Strategy	3	Elective
CS401.6	CS Honours Award Project	6	Compulsory
CS402.3	Computer Graphics and Visualization	3	Core
CS403.3	Intelligent Systems	3	Core
CS404.3	Parallel and Distributed Computing	3	Core
SE403.3	Platform Based Development	3	Elective
CS406.3	Bio Informatics	3	Elective
SE404.3	Agent Based Systems	3	Elective
CS407.3	Internet of Things	3	Elective
CS408.3	Embedded Systems	3	Elective
SE402.3	Development of Enterprise Applications II	3	Elective
CS405.3	Data Warehousing and Data Mining	3	Elective

In the final year of study, students culminate their learning by acquiring specialized subject content required for diverse industries and knowledge on contemporary developments. Students also get an opportunity to showcase their learning over the years via the award specific project.

7. How will I learn on this award?

Your learning opportunities include, e-learning and classroom based learning, and involves a broad spectrum of activities appropriate to the learning outcomes and the assessment methods. These activities range from entirely self-managed study, timetabled formal lectures, tutorials, laboratory based work and presentations. You will have opportunities to use and develop theoretical knowledge, computer based models, and to design, to implement and to test. The transferable skills of presenting, writing, discussing, working with others, and managing your own time are developed through the programme.

Enquiry-based learning is a particularly effective approach to learning and involves you on your own or in a project group being asked to investigate, collect and analyse information and generate new knowledge. This is considered to facilitate deep as opposed to shallow learning.

In developing the programme consideration has been given to the overall learning and assessment strategy, and to the impact on your workloads. As would be expected for any degree programme, you are expected to have a high level of commitment and to be responsive to the challenges at their relative levels as you progress through the programme. Part of these challenges is for you to develop your time management and personal learning skills. Assignments are normally given to you early in a module and you should have ample opportunity to complete the work if you manage your time effectively.

The requirements of the modules will be communicated to you through module descriptors and by discussions with module tutors.

8. How would my progress be assessed?

8.1 Module Grading Scheme

The Grading System for study modules of this programme are given in Table 5.

Table 5 – Module Grading Scheme (Source: UGC Circular 901)

Range of Marks	Grade	Grade Point (GP)	Classification
85-100	A+	4.0	First Class
70-84	A	4.0	
65-69	A-	3.7	
60-64	B+	3.3	Second Upper
55-59	B	3.0	Second Lower
50-54	B-	2.7	Pass
45-49	C+	2.3	
40-44	C	2.0	
35-39	C-	1.7	NA
30-34	D+	1.3	
25-29	D	1.0	
00-24	F	0	

8.2 Module Completion

A student requires obtaining a minimum of 40 marks (C Grade/GP 2.0) for a module to be considered as having passed (completed) that module. Students not fulfilling this requirement for a module should retake the failed assessment components or the complete module with attendance as determined by the Module Examination Board. For the referred attempts for modules the marks are capped at 40 (C grade/GP 2.0). A completed module contributes the full credit allocation of that module towards the total credit requirement of the award.

A marginally failed module with a grade point not less than 1.3 could be compensated and award a pass (grade C/GP 2.0), on discretion of the award board. However, maximum of one module per level of study can be compensated and the final year project and industry placement modules shall not be compensated.

8.3 Progression

Students should pass all the required modules of a level to fulfill the credit requirement for that level. However, students can progress to study in the next level while having maximum of 3 outstanding modules (failed modules) in the previous levels.

8.4 Graduation and Award Classification

To complete an award and graduate, a student should complete all the module requirement of that award and gain 120 credits or more in total for BSc (Hons) in Computer Science award.

For the determination of the award classification, average of the Module Grade Points (GP) weighted by the credit allocation is calculated across all modules, excluding any non-GPA modules (internship) as follows.

$$GPA = \frac{\sum_i^N Credit\_weight_i * GP_i}{\sum_i^N Credit\_weight_i}$$

The award classification is determined by applying the same criteria given for modules, which is shown in Table 5, to the GPA.

9. Support and Guidance

9.1 Academic Support and Guidance

Throughout your course you will meet the Module Lecturers at the taught sessions. If you require additional advice and guidance, please do not hesitate to contact the Module Lecturers, Programme Director or the Programme Administrator.

Please contact your lecturer if you have any concerns about assessments or any other aspect of your course. Generic support with studying, assignments and assessments can be found on the NSBM intranet.

9.2 General Support and Guidance

If you have concerns about your ability to complete your course for any reason, you are strongly encouraged to speak to your Programme Director, Programme Administrator or any Lecturer that you are comfortable with.

10.How do I hand in assignments?

You will normally be required to hand in written assignments relating to the School of Computing modules either to the Programme Administrator or to the LMS (Learning Management System). Instructions for the submission of practical assignments will be included in the LMS or on assessments briefs.

It is your responsibility to ensure that you submit assignments on time and at the appropriate place.

PLEASE NOTE – we would strongly recommend that it is always better to submit your assignment on time even if you feel that you could have done better or might have needed a 'few more hours to finish it off'. Work which is submitted late will get a zero-grade.

Module lecturers will normally give out assignment details with plenty of time before submission to allow you to manage your time and develop your assessment. It is always advisable to start early on assignments, create early drafts, so that if just before submission something adverse happens you do have draft to hand-in.
Finally, of course, it is good practice to keep a hard or (backed-up) electronic copy of draft assignments just in case computers crash. Similar keep a copy of all submitted assignment just in case it gets lost, then you will have the receipt to prove that you handed it in, and a copy to replace what has been lost.

11. Industry Placements

All Computer Science students have the opportunity to undertake a placement at the beginning of Level 3. Carrier Guidance Advisor will provide you with support in finding a placement.

The details of the Industry placement can be found in the Industry placement module descriptor and the 'Industrial Placement Handbook' is available to all students considering going on a placement. This handbook gives full information on the aims, objectives, requirements, supervision and assessment of an industrial placement. More information can be accessed via the LMS. Note that Industry placement module is a core/compulsory module and is not compensatable and student should score minimum of 40%.

12. Final Year Project/Dissertation

Award Project contributes 6 credits at level 4 for the Honors degree.

Fuller details are available in a separate Project Handbook, available at the commencement of Level 4. These are major pieces of individual investigative work involving planning, literature survey, practical and simulated experimentation, and detailed analysis. Assessment is based on a range of interim progress reports, a final project dissertation, and oral presentations. The project is intended to combine, develop and assess the range of your subject-specific and transferable skills.

At the appropriate time students will be able to choose a project, and assigned a supervisor.

Satisfactory completion of the Project module is a compulsory requirement and a minimum of 40% mark is required.