



National School of Business Management

Faculty of Computing

Award Handbook

**BSc in Software Engineering
BSc (Hon) in Software Engineering**

Date of Production: July 2015

Date of Revision: July 2020

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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: Dr. Achala Pallegedara (achala@nsbm.lk)

2.2 Administrative Contacts

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

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

Programme Office: Kanchana (kanchana@nsbm.lk)

Examination Unit: PamodaPiumini (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?

The aims of the award are:

- to develop confidence to use latest concepts to design and develop Software solutions for an organization/individual;
- to develop lone learning aptitude to acquire new knowledge required for an assignment which associated with novel concepts;
- to admire intellectual works of others and to abide by industry norms and ethics stipulated by professional bodies;
- to communicate effectively and efficiently with clients and with peers both verbally and in writing;
- to collaborate in groups to achieve common goals;
- to satisfy the academic criteria required for the membership of professional institutions.

Awards in Software Engineering attempt to develop the following subject specific skills.

- Business analysis and process engineering skills
- Requirement analysis and software design skills
- Programming skills
- Hardware/software acquisition, implementation and maintenance trouble shooting skills
- Network design and implementation skills
- Database design and administration skills
- Internet and system security skills
- Project, people, and change management skills

Software Engineering graduates join industry as entry level professionals in the field of software engineering and programming, testing and quality assurance, database administration, and development, business analysis and systems integration, and software architecture development. Graduates who study at either three-year or four-year degree, can enter the employment market in various sectors. Main employment sectors include:

- Software development 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/Software service providers)

4. Graduate attributes

When you complete the degree programme, as a Software Engineering Graduate you should gain the following attributes.

Knowledge:Show mastery of software engineering knowledge and skills and of the professional standards necessary to begin practice as a software engineer. Demonstrate an understanding of and apply appropriate theories, models, and techniques that provide a basis for problem identification and analysis, software design, development, implementation, verification, and documentation.

Skills:

*Design:*Design appropriate solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal, and economic concerns.

*Learning:*Learn new models, techniques, and technologies as they emerge and appreciate the necessity of such continuing professional development.

*Teamwork:*Work both individually and as part of a team to develop and deliver quality software artifacts.

Leadership and management: Lead software development teams to achieve project objectives within the defined time frames. Reconcile conflicting project objectives, finding acceptable compromises within the limitations of cost, time, knowledge, existing systems, and organizations.

Communication: Effectively communicate with all stakeholders in a typical software development environment.

Attitudes:

Demonstrate an understanding and appreciation of the importance of negotiation, communication, effective work habits and teamwork. Demonstrate positive attitudes and social responsibility. Exercise initiative, personal responsibility and accountability and willingness to undertake further training and develop additional skills as required by the industry.

5. What are the specific award learning outcomes?

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

Knowledge & Understanding: Demonstrate a systematic understanding of computing concepts and principles. Show mastery of software engineering knowledge and skills and of the professional standards necessary to begin practice as a software engineer.

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

Enquiry: Initiate and carry out Software Engineering projects. Ethically gather information pertaining to computing problems, possible solutions, and the success of these solutions, from existing or potential users and/or organisations using established Software Engineering practices. 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.

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

Problem Solving: Design appropriate solutions in one or more application domains using software engineering approaches 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.

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 software; project management documentation.

Application: Demonstrate an understanding of and apply appropriate theories, models, and techniques that provide a basis for problem identification and analysis, software design, development, implementation, verification, and documentation.

Reflection: Critically evaluate your performance as an academic and a professional Software Engineer, considering both process and product. Plan how to make your performance (process and product) more relevant and more effective.

Professional Practice: Work both individually and as part of a team to develop and deliver quality software artefacts. Demonstrate an understanding and appreciation of the importance of negotiation, effective work habits, leadership, and good communication with stakeholders in a typical software development environment. 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?

BSc in Software Engineering is a 3 year programme with total credit weighting amounting to 90. BSc (Hons.) in Software Engineering is a 4 year 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 8 credits in Year 4.

A credit is defined as the workload of 15 lecture hours or 30/45 Tutorial/Laboratory hours or 90 hours of industrial training. For a single credit, students are also expected to spend 2-2.5 hours on independent learning weekly over an average 15 weeks term.

6.1 Year 1 /Level 1 (SLQL 3)

In Year 1, students follow a curricula consisting of six Software Engineering core modules and four foundation (elective) modules from wider discipline of computing science and mathematics. Table 1 below, specifies the subject modules students follow at this level. This level of study lays a strong computing and software engineering foundation to the students on which they develop more specialised learning related to software engineering and systems and application specialties.

Table 1 – Level 1 modules for all Software Engineering awards.

Term	Module Code	Module Name	Credit Value
1 (18 weeks)	CS101.3	Introduction to Computer Science (Foundation/Elective)	3
	MA101.3	Mathematics I (Foundation/Elective)	3
	CS102.3	Programming in C (Core)	3
	CS103.3	Professional Development (Core)	3
2 (10 weeks)	CN101.3	Data communications and networks (Foundation/Elective)	3
	SE101.3	Object Oriented Programming with Java (Core)	3
3 (18 weeks)	CS106.3	Algorithms and Data structures (Core)	3
	CS104.3	Computer Architecture (Core)	3
	CS105.3	Database Management Systems (Core)	3
	SE102.3	Web Based Application Development (Foundation/Elective)	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 Software Engineering body of knowledge by following 5 core modules. Students also continue leaning 5 computing elective/foundation modules that provides them a strong computing foundation including exposure to business processes. 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 Software Engineering awards.

Term	Module Code	Module Name	Credit Value
1 (18 weeks)	CS201.3	Operating Systems (Foundation/Elective)	3
	SE202.3	Introduction to Software Engineering (Core)	3
	MA201.3	Mathematics II (Core)	3
	SE201.3	Systems Analysis and Design (Core)	3
2 (10 weeks)	CS203.3	Algorithms and Complexity (Foundation/Elective)	3
	CN201.3	Computer Networks (Foundation/Elective)	3
3 (18 weeks)	SE204.3	Development of Enterprise Applications I (Foundation/Elective)	3
	SE205.3	Software Architecture (Core)	3
	SE206.3	Human Computer Interaction (Core)	3
	IS301.3	Business Processes and ERP(Foundation/Elective)	3

Note: Please refer module descriptors for further module details.

6.3 Year 3 /Level 3 (SLQL 5)

In Year 3, students continue to follow 8 core modules including the internship module that amounts to a total of 29 credits. Students are also offered 2 elective modules and they should choose at least one module to cover the credit requirement for Level 3. Table 3 below lists down the modules available at level 3.

At the end of Level 3 students have covered all core SE subject areas together with a significant number of elective modules addressing related systems and application specialties and provides an acceptable exit point for BSc in Software engineering award. Students those opt for the 3 year BSc in Software Engineering degree should undertake SE award project as a core module in addition to the other 8 core modules mentioned before and they do not have to take any elective modules.

Table 3 – Level 3 modules for the Software Engineering awards.

Module Code	Module Name	Credit Value	Type
MA301.3	Mathematics III	3	Core
SE304.3	Software Quality Assurance	3	Core
SE307.3	Social Issues and Professional Practice	3	Core
SE301.3	SW Process Management	3	Core
CS306.3	Information Assurance and Security	3	Core
SE207.3	Software Verification and Validation	3	Core
SE308.3	Software Process	3	Core
SE305.8	Internship (non-GPA)*	8	Core
SE303.3	Mobile Application Development	3	Elective
CS304.3	Advanced Database Management Systems	3	Elective
SE306.3	SE Award Project	3	Core**

Notes –

* Internship module does not contribute to the GPA calculation for the determination of the Award classification, but contributes to the credit requirement at Level 3.

** SE Award Project is only for the BSc in Software Engineering 3 year award.

Please refer module descriptors for further module details.

In year 3, Students undertake internship in a 18 week term along with one to two subjects delivered after hours and during the weekend. In the remaining two terms of Level 3, students continue to follow the remaining 5 to 6 subjects delivered after hours and the weekends.

6.4 Year 4 /Level 4 (SLQL 6)

In Year 4, BSc (Hons) in Software Engineering students follow 2 core modules including the award specific project that weigh 8 credits and continue throughout the year. To satisfy the credit requirement of Level 4, students have to undertake minimum of 7 elective modules from a total of 12 offered modules though all elective modules will not be offered in a given term. Table 4 specifies the modules available for level 4. Refer module descriptors for more information on each module.

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

Module Code	Module Name	Credit Value	Type
BS401.3	Business Policy and Strategy	3	Core
SE401.6	SE Honours Award Project	8	Core
CS403.3	Intelligent Systems	3	Elective
CS404.3	Parallel and Distributed Computing	3	Elective
CS405.3	Data Warehousing and Data Mining	3	Elective
CS407.3	Internet of Things	3	Elective
CS408.3	Embedded Systems	3	Elective
SE403.3	Platform Based Development	3	Elective
SE402.3	Development of Enterprise Applications II	3	Elective
SE404.3	Agent Based Systems	3	Elective
CN402.3	Enterprise Networks	3	Elective
CS402.3	Computer Graphics and Visualization	3	Elective
IS401.3	Management Information Systems	3	Elective
IS402.3	E-Business Application Development	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 90 credits or more in total for BSc in Software Engineering award and 120 credits or more in total for BSc (Hons) in Software Engineering award.

For the determination of the award classification, a Grade Point Average (GPA) weighted by the credit allocation is calculated across all modules, excluding any non-GPA modules as follows.

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

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 Software Engineering 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 3 credits at Level 3 for the Bachelor's degree and 6 credits at level 4 for the Honors degree.

Fuller details are available in a separate Project Handbook, available at the commencement of Level 3 or 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.

In the case of both awards, satisfactory completion of the Project module is a compulsory requirement and a minimum of 40% mark is required.

13. Programme Learning Outcomes to Graduate Attribute Mapping

The Table 6 below illustrates the Programme Learning Outcome mapping to the Software Engineering Graduate Attributes.

Table 6 – Programme Learning Outcomes vs. Graduate Attributes

Programme Learning Outcomes	Knowledge	Skills					Attitudes
		Design	Learning	Team Work	Leadership & management	Communication	
Knowledge & Understanding	X						X
Learning			X				X
Enquiry			X				X
Analysis		X					X
Problem Solving		X					X
Communication						X	X
Application		X					X
Reflection			X				X
Professional Practice				X	X	X	X

14. Module Learning Outcomes to Programme Learning Outcomes Mapping

The Table 7 below illustrates the Module Learning Outcomes mapping to the Programme Learning Outcomes.

Table 7 – Module Learning Outcomes vs. Programme Learning Outcomes
(Key to Programme Learning Outcomes

- | | |
|------------------------------|----------------------------|
| 1. Knowledge & Understanding | 6. Communication |
| 2. Learning | 7. Application |
| 3. Enquiry | 8. Reflection |
| 4. Analysis | 9. Professional Practice) |
| 5. Problem Solving | |

Module Code	Module Name	Programme Learning Outcomes								
		1	2	3	4	5	6	7	8	9
CS101.3	Introduction to Computer Science	X			X	X		X		
MA101.3	Mathematics I	X		X		X		X		
CS102.3	Programming in C	X	X		X	X		X	X	X
CS103.3	Professional Development	X			X		X	X	X	X
CN101.3	Data communications and networks	X			X		X	X		X
SE101.3	Object Oriented Programming with Java	X	X	X	X	X		X	X	
CS106.3	Algorithms and Data structures	X	X	X	X	X		X	X	X
CS104.3	Computer Architecture	X	X	X		X		X		
CS105.3	Database Management Systems	X			X	X		X	X	X
SE102.3	Web Based Application Development	X		X	X	X	X	X		X
CS201.3	Operating Systems	X			X		X	X		
SE202.3	Introduction to Software Engineering	X		X	X			X	X	
MA201.3	Mathematics II	X		X				X		
SE201.3	Systems Analysis and Design	X	X		X		X	X		X
CS203.3	Algorithms and Complexity	X	X		X	X		X	X	X
CN201.3	Computer Networks	X	X	X	X	X				
SE204.3	Development of Enterprise Applications I	X			X	X		X		X
SE205.3	Software Architecture	X			X	X		X	X	
SE206.3	Human Computer Interaction	X			X	X		X		X
IS201.3	Business Processes and ERP	X			X	X		X	X	
MA301.3	Mathematics III	X	X		X	X		X		X
SE304.3	Software Quality Assurance	X			X			X	X	X
SE307.3	Social Issues and Professional Practice	X		X					X	X
SE301.3	SW Process Management	X			X			X	X	X
CS306.3	Information Assurance and Security	X			X			X	X	
SE309.3	Software Verification and Validation	X		X	X			X	X	X
SE308.3	Software Process	X			X			X	X	X
SE305.8	Internship (non-GPA)*	X					X			X
SE303.3	Mobile Application Development	X			X	X		X	X	
CS304.3	Advanced Database Management Systems	X		X	X	X	X	X	X	
SE306.3	SE Award Project		X		X	X	X	X	X	X
BS401.3	Business Policy and Strategy	X			X	X	X	X	X	X
SE401.6	SE Honours Award Project	X	X		X	X	X	X	X	
CS403.3	Intelligent Systems	X			X	X		X	X	X
CS404.3	Parallel and Distributed Computing	X			X	X		X	X	X
CS405.3	Data Warehousing and Data Mining	X			X	X	X	X	X	X
CS407.3	Internet of Things	X			X	X		X	X	X
SE403.3	Platform Based Development	X	X		X	X	X	X	X	X
SE402.3	Development of Enterprise Applications II	X			X	X		X		
SE404.3	Agent Based Systems	X			X	X		X		
CN402.3	Enterprise Networks	X			X				X	
CS402.3	Computer Graphics and Visualization	X			X			X	X	
IS401.3	Management Information Systems	X			X	X	X	X	X	X

IS402.3	E-Business Application Development	X			X	X		X	X	X
CS408.3	Embedded Systems	X	X	X	X	X			X	