

Nagindas Khandwala College (Autonomous)

Affiliated to University of Mumbai



**MKES's Nagindas Khandwala College (Autonomous),
Gate No 5, Bhavishya Bharat Campus, S. V. Road, Malad (West)
Mumbai-400 064**

Programme Code: UBSCCS

Bachelor of Science in Computer Science (B.Sc.CS)

Three Year Integrated Programme -

Six Semesters

Course Structure

Under Choice Based Credit, Grading and Semester System

Implemented during Academic Year- 2019-20

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1. Preamble

There is growing demand of IT Professionals to deal with increasing software development, hardware and automation jobs. IT graduates with logical and problem solving skills are a need of the time. This program is so created to make our graduates are employable.

This Bachelor's Degree Program will provide students the right blend of knowledge and skills along with practical exposure.

2. Objectives

This program of B Sc CS is structured to provide graduates with practical skills required in software development, hardware development and testing field. The main objective of B Sc CS are:-

- To provide intensive theoretical & practical knowledge
- To provide an integrated perspective of IT functioning along with a good amount of exposure to real life cases / technical knowhow.
- To train students with knowledge in the field of logical thinking, problem solving, hardware designing, software engineering and programming.
- To develop students' programming skills to become employable or to start their own entrepreneurial journey.

3. Program Outcome:

Learners will be able to think scientifically and implement practical solutions to the real life problems.

4. Program Specific Outcome:

After completion of this program learners will be:

1. Enhanced with scientific thinking and problem solving skills
2. Able to design computer programs to solve real life problems
3. Capable of designing secure organizational IT structure
4. Capable of handling core Computer Science concepts

5. Scheme of Examination:

The scheme of Examination shall be divided into parts i.e. Continuous Internal Evaluation including Assignment, Projects, Seminars, Case Studies and Class Tests which will be of 25 marks, Semester End Examinations which will be of 75 marks and Practical Examination for some courses which will be of 50 marks. The semester wise Credit Points will be varied from course to course but the value of Credits for Under-Graduate Programme shall be of 120 Credits. Students will have to earn 8 extra credits under autonomy. This will be achieved by doing 1 Course on Environmental Science, 1 Short Term Course from an approved list of certifications and 4 IIT Online Spoken Tutorials.

The Credits are defined in terms of the learner's hours which are divided into two parts such as Actual and Notional. The value of a particular course can be measured in number of Credit Points. The value of One (01) Credit is equal to 15 Hours of learners' load

Scheme of Total Credits

Sr. No.	Year	Credits
1	Year 1	40
2	Year 2	40
3	Year 3	40
	Total Credits from Academics	120
	Additional Credits	8
	Total Credits for Award of Degree	128

5.1 Credit Based Evaluation System Scheme of Examination

For all 6 semesters, the performance of the learners shall be evaluated into two components.

For Semester 1 and 2: the first component shall carry 40% marks which will be a Continuous Internal Evaluation while the second component shall carry 60% marks at semester end examination

For Semesters 3 to 6: The first component shall carry 25% marks which will be a Continuous Internal Evaluation while the second component shall carry 75% marks at semester end examination.

The allocation of marks for the Continuous Internal Evaluation 25% and Semester End Examination 75% and Practical Examination are as shown below:

5.2 Structure of Continuous Internal Evaluation

Sr. No.	Particulars	Marks
1	Class test held in the given semester and online examinations	35 marks
2	Subject specific Term Work Module/assessment modes –as decided by the department in the beginning of the semester (like Extension/field/experimental work, Short Quiz; Objective test, lab practical, open book test etc. and written assignments, Case study, Projects, Posters and exhibits etc. for which the assessment is to be based on class presentations wherever applicable)	35 marks
3	Active participation in routine class instructional deliveries (and in practical work, tutorial, field work etc. as the case may be)	5 marks
	Total:	40 marks

Sr. No.	Particulars	Marks
1	Class test held in the given semester, OR	20 marks
2	Subject specific Term Work Module/assessment modes –as decided by the department in the beginning of the semester (like Extension/field/experimental work, Short Quiz; Objective test, lab practical, open book test etc. and written assignments, Case study, Projects, Posters and exhibits etc. for which the assessment is to be based on class presentations wherever applicable)	20 marks
3	Active participation in routine class instructional deliveries (and in practical work, tutorial, field work etc. as the case may be)	5 marks
	Total:	25 marks

5.2.1 Structure of Practical Examination = 50 marks

Sr. No.	Particulars	Marks
1	Implementation Based	40
2	Viva Voce	05
3	Journal	05

Semester End Examination will be organized after all modules of the course are taught in the class. It will be a written examination / or as per the needs of the course a practical examination or a combination of both. This examination will be for 75 marks, for Semesters III to VI and for 60 marks for Semesters I and II

The assessment of Continuous Internal Evaluation and Semester End Examination as mentioned above for the Semesters I to VI shall be processed by the College – ‘Institutions of their Learners’ and issue the grade cards to them after the conversion of marks into grade as the procedure mentioned below.

The learners to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Continuous Internal Evaluation & Semester End Examination. The learner shall obtain minimum of 40% marks (i.e. 10 out of 25) in the Continuous Internal Evaluation, 40% marks in Semester End Examination (i.e. 30 Out of 75) 40% marks in Practical Examination (i.e. 20 out of 50) separately, to pass the course and minimum of Grade D in each project, wherever applicable, to pass a particular semester. A learner will be said to have passed the course if the learner passes the Continuous Internal Evaluation & Semester End Examination together.

5.3 Passing Standards

Grade	Marks (CIE + SEE)	Practical Marks	Grade Points
O	80 & Above	40 & Above	10
A+	70 to 79.99	35 to 39	9
A	60 to 69.99	30 to 34	8
B+	55 to 59.99	28 to 29	7
B	50 to 54.99	25 to 27	6
C	45 to 49.99	23 to 24	5
D	40 to 44.99	20 to 22	4
F	Less than 40	Less than 20	0

3.4 Approved Certifications for Additional Credits

Table for Additional Autonomy Credits

Table for Autonomy Credits					
Semester	Component	Duration	No. of Courses	Credit/ Course	Total Credits
A. Ability Enhancement Compulsory Course (AECC)					
3	AECC I Environment Science	1 Sem	1	2	2
4	AECC II Online Spoken Tutorials	4 Sem	4	1	4
B. Skill Enhancement Course (SEC)					
1-5	SEC I (Short Term Courses)	30 hrs (Table – 1)	--	2	2
				Total	8

All B. Sc. CS students graduating from Nagindas Khandwala College will earn 8 (Eight) additional credits under autonomy. It is compulsory for every student to earn these credits for grant of a degree. The scheme of credits is explained below.

Course on Environmental Science (EVS)

This course is offered in sem. III for 2 credits. It is compulsory for all students to complete this course. Lectures for this are arranged in college.

IIT Spoken Tutorial Programme

This is a compulsory course offered to all students of B.Sc IT and CS from Semester 2 to Semester 5. Students will choose the suitable course from the list of Spoken Tutorial courses offered by IITB. Students can download the lectures and learn at their pace. An online examination will be conducted by IITB and students will be appearing for the examination at the Computer Lab of the College under the invigilation of a faculty in-charge.

Short Term Courses (STC)

List of Short Term Courses Offered Semester Wise From 2019-20

Sr. No.	STC offered in Semester 1,3 & 5	STC offered in Semester 2 & 4
1	Basic Course in Brahmavidya - ₹ 1,500	Add On Certificate course on Child Care & Child Development ₹2,500
2	Pranic Healing - ₹ 3,300	Add On Certificate course on Travel & Tourism Management ₹2,500
3	Understanding Mental Health - ₹ 5,000	Add On Certificate course on Computer Application ₹2,500
4	Certificate in IFRS ₹ 3,750	Add On Certificate course on Functional English ₹2,500
5	Certificate in QGIS ₹ 3,000	Certificate Course in Gandhian Studies ₹2,000
6	Finding an 'Entrepreneur' in you - ₹2,500	Certificate in GIS ₹ 3,000
7	Working with Vectors (COREL DRAW) – ₹ 4,000	Tie and Dye ₹ 3,000
8	Certificate in Visual Merchandising – ₹ 3,000	Jewellery Making ₹ 3,000 (See *)
9	Certificate Course in Indian Embroidery - ₹ 3,000 (See *)	Working with Bitmap (Photoshop) ₹ 5,000
10	Certificate in Stylization - ₹ 3,000	Grooming and Personality Development ₹ 3,000
11	CASI New York Certification - ₹ 3,540	Mind your Money - ₹ 2,000
12	Certificate in Photography - ₹3,540	Certificate Course in Banking - ₹ 2,500
13	Volunteering Community Services CASI - ₹300	Understanding Pollution through Mobile Application ₹ 500
14	Certificate in Spanish Language ₹ 2,000	Digital Marketing ₹7,000
15	Fundamental of Capital Market and Derivatives ₹ 4,000	Certificate in Mandarin ₹ 2,000
16	Equity Trading Bootcamp ₹ 4,000	Certificate for introduction Beauty ₹ 7,500 (See *)
17	Financial Statement Analysis ₹ 1,500	Certificate for introduction to Hair Dressing ₹ 7,500 (See *)
18	Certificate in Finance ₹ 3,540	Certificate course on music ₹ 5,000
19	Certificate in Methods of Quantitative techniques – ₹ 3,000	Certificate Course in Sports Management ₹ 4,500
20	Mastering Aptitude Skills - ₹2,500	Mastering Analytical Skills ₹ 2,500
21	Enhancing Communication Skills - ₹2,500	Financial Services basics ₹ 2,500
22		Certificate Course in Mobile Journalism ₹ 10,000

Note: -

* Excluding Cost of material supplied

Khandwala College offers 43 Short Term Courses. These courses are divided in even and odd semesters and are organized in vacations. Students have to complete any **ONE** Short Term Course in any one of the semesters between 1 to 5. Courses offered in Sem. 1,3 & 5 are organized during the Diwali break and courses offered in Sem. 2 & 4 are organized in the month of April.

5.5 Exemptions from STC

Students satisfying any one of the criteria listed below will be granted exemption from registering for a short-term course. 2 credits under autonomy will be granted to students who have:-

1. Registered with NSS unit of Khandwala College, who have completed 120 hours with participation at the rural camp, and authorities in charge of NSS at college level have recommended their name for exemption.
2. Won prizes at University, State, National or International level in any sports activity- individual or team - and their name has been recommended by authorities in charge of Gymkhana at college level.
3. Enrolled for NCC unit of Khandwala College, have completed mandatory hours of training and have attended all programs of NCC at Khandwala College and their name has been recommended by authorities in charge of NCC at college level.
4. Represented Khandwala College at any University Cultural Festival and have won prize will be entitled to exemption on recommendation of their name by the Students Council in charge.

Bachelor of Science (Computer Science) Programme

Under Choice Based Credit, Grading and Semester System

Three Year Integrated Programme -

Six Semesters

Basic Structure: Distribution of Courses

1	Ability Enhancement Compulsory Course (AECC)	1 Paper of 2 Credits Hrs. each (Total Credits Hrs. $1*2=02$) 1 Paper of 2 Credits Hrs. each (Total Credits Hrs. $1*2=02$)	04
2	Skill Enhancement Compulsory Course (SEC)	2 Papers of 3 Credits Hrs. each (Total Credits Hrs. $2*3=6$) 2 Papers of 2 Credits Hrs. each (Total Credits Hrs. $2*2=4$) 6 Papers of 1 Credits Hrs. each (Total Credits Hrs. $6*1=6$)	16
3	Core Course (CC)	6 Papers of 3 Credits Hrs. each (Total Credits Hrs. $6*3=18$) 14 Papers of 2 Credits Hrs. each (Total Credits Hrs. $14*2=28$) 18 Papers of 1 Credits Hrs. each (Total Credits Hrs. $18*1=18$)	64
4	Discipline Specific Compulsory Course (DSC)	2 Papers of 2 Credits Hrs. each (Total Credits Hrs. $2*2=4$)	04
5	Discipline Specific Elective (DSE)	8 Papers of 3 Credits Hrs. each (Total Credits Hrs. $8*3=24$) 8 Papers of 1 Credits Hrs. each (Total Credits Hrs. $8*1=8$)	32
	Total Credits Hrs		120

Bachelor of Science in Computer Science (B. Sc. CS) Programme
Under Choice Based Credit, Grading and Semester System
Curriculum Framework
(Implemented during Academic year 2019-20)

FIRST YEAR

Sr. No.	Semester I	Subject code	Credits	Sr. No.	Semester II	Subject code	Credits
	<i>Ability Enhancement Compulsory Course (AECC)</i>				<i>Ability Enhancement Practical Compulsory Course (AECC)</i>		
1.	AECC-1 Communication Skills	2016UISCS	2	1	AECC-1 IT platforms, Tools and Practices	2026UISTP	2
	<i>Skill Enhancement Compulsory Course (SEC)</i>				<i>Skill Enhancement Compulsory Course (SEC)</i>		
2.	SEC-1 Web Programming I	2014UISWP	3	2.	SEC-2 Web Programming II	2024UISWP	3
	<i>Core Course (CC)</i>				<i>Core Course (CC)</i>		
3.	CC-1 Introduction to Programming	2011UISIP	3	3.	CC-4 Programming and Application Development in Python	2021UISPP	3
4.	CC-2 Fundamentals of Computers and Electronics	2012UISFC	3	4	CC-5 Object Oriented Programming	2022UISOO	3
5.	CC-3 Operating Systems	2013UISOS	3	5	CC-6 Database Management Systems I	2023UISDS	3
	<i>Discipline Specific Compulsory Course (DSC)</i>				<i>Discipline Specific Compulsory Course (DSC)</i>		
6.	DSC-1 Discrete Mathematics-I	2015UISDM	2	6.	DSC-2 Discrete Mathematics II	2025UISDM	2
	<i>Skill Enhancement Practical Compulsory Course (SEC)</i>				<i>Skill Enhancement Practical Compulsory Course (SEC)</i>		
	SEC-1	2014UISPR	1	7.	SEC-2	2024UISPR	1

7.	Web Programming I				Web Programming II		
	<i>Core Course Practical (CC)</i>				<i>Core Course Practical (CC)</i>		
8.	CC-1 Introduction to Programming	2011UISPR	1	8.	CC-4 Programming and Application Development in Python	2021UISPR	1
9.	CC-2 Fundamentals of Computers and Electronics	2012UISPR	1	9.	CC-5 Object Oriented Programming	2022UISPR	1
10.	CC-3 Operating Systems	2013UISPR	1	10.	CC-6 Database Management Systems I	2023UISPR	1
	TOTAL		20		TOTAL		20

SECOND YEAR

(Implemented during Academic year 2020-21)

Sr. No.	Semester III	Subject code	Credits	Sr. No.	Semester IV	Subject code	Credits
	<i>Skill Enhancement Compulsory Course (SEC)</i>				<i>Skill Enhancement Compulsory Course (SEC)</i>		
1	SEC-3 Core Java	2031UISCJ	2	1	SEC-3 Design Patterns	2041UISDP	2
	<i>Core Course (CC)</i>				<i>Core Course (CC)</i>		
2	CC-7 Data Structures	2032UISDS	2	2	CC-7 Design and Analysis of Algorithms	2042UISDA	2
3	CC-8 Computer Networks	2033UISCN	2	3	CC-8 System Programming	2043UISSP	2
4	CC-9 Database Management Systems- II	2034UISDB	2	4	CC-9 Software Engineering	2044UISSE	2
	<i>Discipline Specific Compulsory Course (DSC)</i>				<i>Discipline Specific Compulsory Course (DSC)</i>		
5	Descriptive Statistics	2035UISST	2	5	Probability Theory	2045UISPT	2
	<i>Discipline Specific Elective (DSE)</i>				<i>Discipline Specific Elective (DSE)</i>		
	Discipline Specific Elective (DSE-1) (Any <i>ONE</i> of group A)				Discipline Specific Elective (DSE-1) (Any <i>ONE</i> of group A)		
6	Advanced Web Programming - I	2036UISAW	2	6	Advanced Web Programming - II	2046UISAW	2
7	Hybrid Mobile Application Development I	2036UISMD	2	7	Advanced Java	2046UISAJ	2
				8	Hybrid Mobile Application Development II	2046UISMD	2
	Discipline Specific Elective (DSE-1) (Any <i>ONE</i> of group B)				Discipline Specific Elective (DSE-1) (Any <i>ONE</i> of group B)		
8	Computer Graphics and Animation	2037ICSCG	2	9	Multimedia Systems	2047UISMS	2
9	Embedded Systems	2037ICSES	2	10	Internet of Things	2047UISIT	2
10	Theory of Computation I	2037UCSTC	2	11	Theory of Computation II	2047UCSTC	2
	<i>Skill Enhancement Practical Compulsory Course (SEC)</i>				<i>Skill Enhancement Practical Compulsory Course (SEC)</i>		
11	SEC-3 Core Java	2031UISPR	1	12	SEC-3 Design Patterns	2041UISPR	1

	<i>Core Course Practical (CC)</i>				<i>Core Course Practical (CC)</i>		
12	CC-7 Data Structures	2032UISPR	1	13	CC-7 Design and Analysis of Algorithms	2042UISPR	1
13	CC-8 Computer Networks	2033UISPR	1	14	CC-8 System Programming	2043UISPR	1
14	CC-9 Database Management Systems- II	2034UISPR	1	15	CC-9 Software Engineering	2044UISPR	1
	<i>Discipline Specific Elective Practical (DSE)</i>				<i>Discipline Specific Elective Practical (DSE)</i>		
	Discipline Specific Elective Practical (DSE- 1) (Any <i>ONE</i> of group A)				Discipline Specific Elective Practical (DSE-1) (Any <i>ONE</i> of group A)		
15	Advanced Web Programming - I	2036UISAWPR	1	16	Advanced Web Programming - II	2046UISAWPR	1
				17	Advanced Java	2046UISAJPR	1
16	Hybrid Mobile Application Development I	2036UISMDPR	1	18	Hybrid Mobile Application Development II	2046UISMDPR	1
	Discipline Specific Elective Practical (DSE- 1) (Any <i>ONE</i> of group A)				Discipline Specific Elective Practical (DSE-1) (Any <i>ONE</i> of group A)		
17	Computer Graphics and Animation	2037UISCGPR	1	19	Multimedia	2047UISMSPR	1
18	Embedded Systems	2037UISESPR	1	20	Internet of Things	2047UISITPR	1
19	Theory of Computation I	2037UISTCPR	1	21	Theory of Computation II	2047UISTCPR	1
	TOTAL		20			TOTAL	20

THIRD YEAR

(Implemented during Academic year 2019-2020)

Sr No	Semester V	Subject code	Credits	Sr. No	Semester VI	Subject code	Credits
	<i>Skill Enhancement Compulsory Course (SEC)</i>				<i>Skill Enhancement Compulsory Course (SEC)</i>		
1	SEC-3 Game Programming	1857UCSGP	2		SEC-4 Ethical Hacking	1867UCSEH	2
	<i>Discipline Specific Elective (DSE)</i>				<i>Discipline Specific Elective (DSE)</i>		
	Discipline Specific Elective (DSE-1) (Any TWO of group A)				Discipline Specific Elective (DSE-3) (Any TWO of group A)		
2	a. Artificial Intelligence	1851UCSAI	3		a. Architecting of IoT	1861UCSIT	3
3	a. Linux Server Administration	1852UCSLA	3		a. Cloud Computing	1862UCSCC	3
4	a. Software Testing and Quality Assurance	1853UCSST	3		a. Cyber Forensics	1863UCSCF	3
	Discipline Specific Elective (DSE-2) (Any TWO of group B)				Discipline Specific Elective (DSE-4) (Any TWO of group B)		
5	b. Information and Network Security	1854UCSNS	3		b. Information Retrieval	1864UCSIR	3
6	b. Wireless Sensor Networks and Mobile Communication	1855UCSWN	3		b. Digital Image Processing	1865UCSDP	3
7	b. Web Services	1856UCSWS	3		b. Data Science	1866UCSDS	3
	<i>Skill Enhancement Practical Compulsory Course (SEC)</i>				<i>Skill Enhancement Practical Compulsory Course (SEC)</i>		
8	SEC-3 Game Programming	1857UCSPR	1		SEC-5 Ethical Hacking	1867UCSPR	1

9	SEC-4 Project Implementation	1858UCSPR	1		SEC-6 Project Implementation	1868UCSPR	1
	<i>Discipline Specific Elective Practical (DSE)</i>				<i>Discipline Specific Elective Practical (DSE)</i>		
	Discipline Specific Elective Practical (DSE-1) (Any TWO of group A)				Discipline Specific Elective Practical (DSE-3) (Any one of group A)		
	a. Artificial Intelligence	1851UCSPR	1		a. Architecting of IoT	1861UCSPR	1
	a. Linux Server Administration	1852UCSPR	1		a. Cloud Computing	1862UCSPR	1
	a. Software Testing and Quality Assurance	1853UCSPR	1		a. Cyber Forensics	1863UCSPR	1
	Discipline Specific Elective Practical (DSE-2) (Any two of group B)				Discipline Specific Elective Practical (DSE-4) (Any two of group B)		
	b. Information and Network Security	1854UCSPR	1		b. Information Retrieval	1864UCSPR	1
	b. Wireless Sensor Networks and Mobile Communication	1855UCSPR	1		b. Digital Image Processing	1865UCSPR	1
	b. Web Services	1856UCSPR	1		b. Data Science	1866UCSPR	1
	TOTAL		20		TOTAL		20