# 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: UBSCIT**

**Bachelor of Science in Information Technology (B.Sc.IT)**

**Three Year Integrated Programme -**

**Six Semesters**

*Course Structure*

**Under Choice Based Credit, Grading and Semester System**

*Implemented during Academic Year- 2020-21*

# INDEX

# 1. Preamble

There is growing demand of IT Professionals to deal with increasing software development 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 IT is structured to provide graduates with practical skills required in software development and testing field. The main objective of B Sc IT 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, 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 managing the security of organizational IT structure

## 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, Semester End Examinations and Practical Examination for the 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 particulars 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 and Semester End Examination 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 | 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) | 15 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 |

**5.4 Approved Certifications for Additional Credits**

**Table for Additional Autonomy Credits**

| Semester | Component | Duration | No. of Courses | Credit/ Course | Total Credits |
|---|---|---|---|---|---|
| **Table for Autonomy Credits** | | | | | |
| *A. Ability Enhancement Compulsory Course (AECC)* | | | | | |
| 3 | **AECC I** Environment Science | 1 Sem | 1 | 2 | 2 |
| 4 | **AECC II** Online IIT 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. IT 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 IIITB 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 (Photshop) ₹ 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 and 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.

**3.5 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 (Information Technology) 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<br>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<br>2 Papers of 2 Credits Hrs. each (Total Credits Hrs. 2*2)= 4<br>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<br>14 Papers of 2 Credits Hrs. each (Total Credits Hrs. 14*2)= 28<br>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) | 04 |
| 5 | **Discipline Specific Elective (DSE)** | 8 Papers of 3 Credits Hrs. each (Total Credits Hrs. 8*3)= 24<br>8 Papers of 1 Credits Hrs. each (Total Credits Hrs. 8*1)= 08 | 32 |
| | **Total Credits Hrs** | | **120** |

## Bachelor of Science in Information Technology (B.Sc. IT) 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 | Cred its |
|---|---|---|---|---|---|---|---|
| | *Ability Enhancement Compulsory Course (AECC)* | | | | *Ability Enhancement Practical Compulsory Course (AECC)* | | |
| 1. | AECC-1 Communication Skills | **1916UISCS** | 2 | 1 | AECC-1 IT platforms, Tools and Practices | **1926UISTP** | 2 |
| | *Skill Enhancement Compulsory Course (SEC)* | | | | *Skill Enhancement Compulsory Course (SEC)* | | |
| 2. | SEC-1 Web Programming I | **1914UISWP** | 3 | 2. | SEC-2 Web Programming II | **1924UISWP** | 3 |
| | *Core Course (CC)* | | | | *Core Course (CC)* | | |
| 3. | CC-1 Introduction to Programming | **1911UISIP** | 3 | 3. | CC-4 Programming and Application Development in Python | **1921UISPP** | 3 |
| 4. | CC-2 Fundamentals of Computers and Electronics | **1912UISFC** | 3 | 4 | CC-5 Object Oriented Programming | **1922UISOO** | 3 |
| 5. | CC-3 | **1913UISOS** | 3 | 5 | CC-6 | **1923UISDS** | 3 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Operating Systems | | | | | Database Management Systems I | | | |
| | *Discipline Specific Compulsory Course (DSC)* | | | | *Discipline Specific Compulsory Course (DSC)* | | |
| 6. | DSC-1 Discrete Mathematics-I | **1915UISDM** | 2 | 6. | DSC-2 Discrete Mathematics II | **1925UISDM** | 2 |
| | *Skill Enhancement Practical Compulsory Course (SEC)* | | | | *Skill Enhancement Practical Compulsory Course (SEC)* | | |
| 7. | SEC-1 Web Programming I | **1914UISPR** | 1 | 7. | SEC-2 Web Programming II | **1924UISPR** | 1 |
| | *Core Course Practical (CC)* | | | | *Core Course Practical (CC)* | | |
| 8. | CC-1 Introduction to Programming | **1911UISPR** | 1 | 8. | CC-4 Programming and Application Development in Python | **1921UISPR** | 1 |
| 9. | CC-2 Fundamentals of Computers and Electronics | **1912UISPR** | 1 | 9. | CC-5 Object Oriented Programming | **1922UISPR** | 1 |
| 10. | CC-3 Operating Systems | **1913UISPR** | 1 | 10. | CC-6 Database Management Systems I | **1923UISPR** | 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 |
|---|---|---|---|---|---|---|---|
| | *Skill Enhancement Compulsory Course (SEC)* | | | | *Skill Enhancement Compulsory Course (SEC)* | | |
| 1 | SEC-3 Core Java | 2031UISCJ | 2 | 1 | SEC-3 Design Patterns | 2041UISDP | 2 |
| | *Core Course (CC)* | | | | *Core Course (CC)* | | |
| 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 |
| | *Discipline Specific Compulsory Course (DSC)* | | | | *Discipline Specific Compulsory Course (DSC)* | | |
| 5 | Descriptive Statistics | 2035UISST | 2 | 5 | Probability Theory | 2045UISPT | 2 |
| | *Discipline Specific Elective (DSE)* | | | | *Discipline Specific Elective (DSE)* | | |
| | Discipline Specific Elective (DSE-1) (Any *ONE* of group A) | | | | Discipline Specific Elective (DSE-1) (Any *ONE* of group A) | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6 | Advanced Web Programming - I | 2036UISAW | 2 | 6 | Advanced Web Programming - II | 2046UISAW | 2 |
| 7 | Hybrid Mobile Application Development 1 | 2036UISMD | 2 | 7 | Hybrid Mobile Application Development II | 2046UISMD | 2 |
| | Discipline Specific Elective (DSE-1) (Any *ONE* of group B) | | | | Discipline Specific Elective (DSE-1) (Any *ONE* of group B) | | |
| 8 | Computer Graphics and Animation | 2037UISCG | 2 | 8 | Multimedia Systems | 2047UISMS | 2 |
| 9 | Embedded Systems | 2037UISES | 2 | 9 | Internet of Things | 2047UISIT | 2 |
| 10 | Principles of Management | 2037UITPM | 2 | 10 | Principles of Marketing | 2047UITPM | 2 |
| | *Skill Enhancement Practical Compulsory Course (SEC)* | | | | *Skill Enhancement Practical Compulsory Course (SEC)* | | |
| 11 | SEC-3 Core Java | 2031UISPR | 1 | 11 | SEC-3 Design Patterns | 2041UISPR | 1 |
| | *Core Course Practical (CC)* | | | | *Core Course Practical (CC)* | | |
| 12 | CC-7 Data Structures | 2032UISPR | 1 | 13 | CC-7 Design and Analysis of Algorithms | 2042UISPR | 1 |
| 13 | CC-8 Computer Networks | 2033UISPR | 1 | 13 | CC-8 System Programming | 2043UISPR | 1 |
| 14 | CC-9 Database Management Systems- II | 2034UISPR | 1 | 14 | CC-9 Software Engineering | 2044UISPR | 1 |
| | *Discipline Specific Elective Practical (DSE)* | | | | *Discipline Specific Elective Practical (DSE)* | | |

| | Discipline Specific Elective Practical (DSE-1) (Any *ONE* of group A) | | | | Discipline Specific Elective Practical (DSE-1) (Any *ONE* of group A) | | |
|---|---|---|---|---|---|---|---|
| 15 | Advanced Web Programming - I | 2035UISPR | 1 | 15 | Advanced Web Programming - II | 2045UISPR | 1 |
| 16 | Hybrid Mobile Application Development I | 2037UISPR | 1 | 16 | Hybrid Mobile Application Development II | 2047UISPR | 1 |
| | Discipline Specific Elective Practical (DSE-1) (Any *ONE* of group A) | | | | Discipline Specific Elective Practical (DSE-1) (Any *ONE* of group A) | | |
| 17 | Computer Graphics and Animation | 2036UISPR | 1 | 17 | Multimedia | 2046UISPR | 1 |
| 18 | Embedded Systems | 2038UISPR | 1 | 18 | Internet of Things | 2048UISPR | 1 |
| 19 | Principles of Management | 2039UISPR | 1 | 19 | Principles of Marketing | 2049UISPR | 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 |
|---|---|---|---|---|---|---|---|
| | *Skill Enhancement Compulsory Course (SEC)* | | | | *Skill Enhancement Compulsory Course (SEC)* | | |
| 1 | SEC-5 Software Project Management | **1851UITPM** | 3 | 1 | SEC-8 Software Quality Assurance | **1861UITSQ** | 3 |
| 2 | SEC-6 Internet of Things | **1852UITIT** | 3 | 2 | SEC-9 Security in Computing | **1862UITSC** | 3 |
| 3 | SEC-7 Advanced Web Programming | **1853UITWP** | 3 | 3 | SEC-10 Business Intelligence | **1863UITBI** | 3 |
| | *Discipline Specific Elective (DSE)* | | | | *Discipline Specific Elective (DSE)* | | |
| 4 | Discipline Specific Elective (DSE-1) (Any *one* of group A) | | | 4 | Discipline Specific Elective (DSE-3) (Any *one* of group A) | | |
| | a. Artificial Intelligence | **1854UITAI** | 3 | | a. Principles of Geographic Information Systems | **1864UITGI** | 3 |
| | b. Linux System Administration | **1855UITLA** | 3 | | b. Enterprise Networking | **1865UITEN** | 3 |
| 5 | Discipline Specific Elective (DSE-2) (Any *one* of group B) | | | 5 | Discipline Specific Elective (DSE-4) (Any *one* of group B) | | |
| | a. Enterprise Java | **1856UITEJ** | 3 | | a. IT service Management | **1866UITIS** | 3 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | b. Next Generation Technologies | **1857UITNG** | 3 | | b. Cyber Law | **1867UITCL** | 3 |
| | *Skill Enhancement Practical Compulsory Course (SEC)* | | | | *Skill Enhancement Practical Compulsory Course (SEC)* | | |
| 6 | SEC-5 Project Dissertation | **1851UITPR** | 1 | 6 | SEC-8 Project Implementation | **1861UITPR** | 1 |
| 7 | SEC-6 Internet of Things | **1852UITPR** | 1 | 7 | SEC-9 Security in Computing | **1862UITPR** | 1 |
| 8 | SEC-7 Advanced Web Programming | **1853UITPR** | 1 | 8 | SEC-10 Business Intelligence | **1863UITPR** | 1 |
| | *Discipline Specific Elective Practical (DSE)* | | | | *Discipline Specific Elective Practical (DSE)* | | |
| | Discipline Specific Elective Practical (DSE-1) (Any *one* of group A) | | | | Discipline Specific Elective Practical (DSE-3) (Any *one* of group A) | | |
| 9 | a. Artificial Intelligence | **1854UITPR** | 1 | 9 | a. Principles of Geographic Information Systems | **1864UITPR** | 1 |
| 10 | b. Linux System Administration | **1855UITPR** | 1 | 10 | b. Enterprise Networking | **1865UITPR** | 1 |
| | Discipline Specific Elective Practical (DSE-2) (Any *one* of group B) | | | | Discipline Specific Elective Practical (DSE-4) | | |
| 11 | a. Enterprise Java | **1856UITPR** | 1 | 11 | a. Advanced Mobile Programming | **1866UITPR** | 1 |
| 12 | b. Next Generation Technologies | **1857UITPR** | 1 | | | | |
| | **TOTAL** | | **20** | | **TOTAL** | | **20** |