SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

(NAAC Re-accredited with 'A' Grade)

School of Computational Sciences

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

CURRICULUM FRAMEWORK AND SYLLABUS

FOR OUTCOME BASED EDUCATION IN

Master of Computer Applications (M.C.A) Degree Program

FOR THE STUDENTS ADMITTED FROM THE

ACADEMIC YEAR 2019-2020 ONWARDS

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BOS meeting approved: __/__/2019

Approved in ____ Academic Council meeting on __/__/2019

Director
School of Computational Sciences
S.R.T.M. University, Nanded (M.S.)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
SCHOOL OF COMPUTATIONAL SCIENCES
Master of Computer Applications (M.C.A) Degree Program

COURSES OF STUDY
(For the candidates admitted from 2019-2020 onwards)

FIRST SEMESTER

Course Code	Name of Course	Category	No. Of Hours/Week			Credits
			L	T	P	
Theory						
MCA 101	Programming Logic	HSS	4	1	-	4
MCA 102	Data Structure using C	PC	4	1	-	4
MCA 103	Computer Organization & Architecture	PC	4	1	-	4
MCA 104	Introduction to Management Function	MP	4	1	-	4
MCA 105	Mathematical Foundation	BS	4	1	-	4
Practical						
MCA 106	Lab-1 C Programming	PCL	-	-	6	2
MCA 107	Lab-2 Computer Organization & Architecture	PCL	-	-	6	2
Open Elective						
MCA 108	Open Elective	OE	2	1	-	2
		Total	22	06	12	26

SECOND SEMESTER

Course Code	Name of Course	Category	No. Of Hours/Week			Credits
			L	T	P	
Theory						
MCA 201	System Analysis and Design	PC	4	1	-	4
MCA 202	Design Analysis & Algorithm using C++	PC	4	1	-	4
MCA 203	Management Information System	MP	4	1	-	4
MCA 204	Probability & Statistics	BS	4	1	-	4
MCA 205	Oral and Written Communication Skills	HSS	4	1	-	4
Practical						
MCA 206	Lab-3 C++ Programming	PCL	-	-	6	2
MCA 207	Lab-4 Data Communication	PCL	-	-	6	2
Open Elective						
MCA 208	Open Elective	OE	2	1	-	2
		Total	22	06	12	26

THIRD SEMESTER

Course Code	Name of Course	Category	No. Of Hours/Week			Credits
			L	T	P	
Theory						
MCA 301	Software Engineering	PC	4	1	-	4
MCA 302	Visual Programming Tools	PC	4	1	-	4
MCA 303	Data Communication and Computer Networks	PC	4	1	-	4
MCA 304	Relational Database Management System	MP	4	1	-	4
MCA 305	Graph Theory	BS	4	1	-	4
Practical						
MCA 306	Lab-5 Visual Programming	PCL	-	-	6	2
MCA 307	Lab-6 RDBMS	PCL	-	-	6	2
Open Elective						
MCA 308	Open Elective	OE	2	1	-	2
		Total	22	06	12	26

FOURTH SEMESTER

Course Code	Name of Course	Category	No. Of Hours/Week			Credits
			L	T	P	
Theory						
MCA 401	Compiler Designing	PC	4	1	-	4
MCA 402	Java Programming	PC	4	1	-	4
MCA 403	Operating System Concepts	PC	4	1	-	4
MCA 404	Elective-1	PE	4	1	-	4
MCA 405	Elective-2	PE	4	1	-	4
Practical						
MCA 406	Lab-7 Java Programming	PCL	-	-	6	2
MCA 407	Lab-8 Advance Data Structure	PCL	-	-	6	2
Open Elective						
MCA 408	Open Elective	OE	2	1	-	2
		Total	22	06	12	26

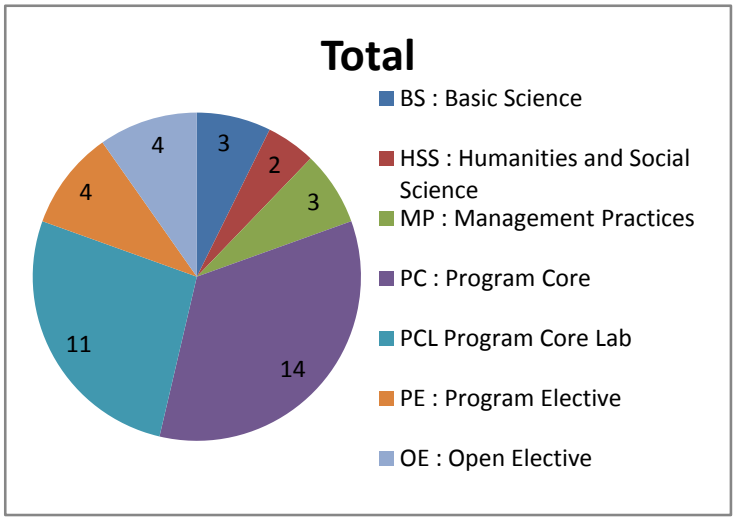
FIFTH SEMESTER

Course Code	Name of Course	Category	No. Of Hours/Week			Credits
			L	T	P	
Theory						
MCA 501	Cryptography & Network Security	PC	4	1	-	4
MCA 502	Data Mining & Data Warehousing	PC	4	1	-	4
MCA 503	Theory of Computation	PC	4	1	-	4
MCA 504	Elective-3	PE	4	1	-	4
MCA 505	Elective-4	PE	4	1	-	4
Practical						
MCA 506	Lab-7 Java Programming	PCL	-	-	6	2
MCA 507	Lab-8 Based on Elective-4	PCL	-	-	6	2
MCA 508	Mini Project	PC	-	-	6	2
		Total	20	05	18	26

SIXTH SEMESTER

Course Code	Name of Course	Category	No. Of Hours/Week			Credits
			L	T	P	
MCA 601	Major Project Activity	PC	-	-	12	25
		Total	-	-	12	25

PC	: Program Core
BS	: Basic Science
HSS	: Humanities & Social Science
MP	: Management Practices
PCL	: Program Core Lab
PE	: Program Elective
OE	: Open Elective
L	: Lecture
T	: Tutorial
P	: Practical



CBCS Revised Syllabus w.e.f AY: 2019-2020
Program: M.Sc.(Computer Application) – Campus School

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
First Semester						
1.	**Core Subjects**	NCA-101	Computer System Organization	2	2	4
2		NCA-102	Elementary Data Structures and Algorithms	2	2	4
3		NCA-103	Mathematical Foundations for Computer Science	2	2	4
Choose any one from below elective subjects						
4	**Elective Subject**	NCA-104 A	Programming Language Concepts	2	2	4
		NCA-104 B	Object Oriented Programming			
Practical /Lab						
5	**Lab / Practical**	NCA-105	Lab-1: Data Structures	1	1	2
		NCA-106	Lab-2: OOP	1	1	2
6	**Open Elective**	NCA-107A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR	4	0	4
		NCA-107 B	Information Communication Technology (ICT)			
7	**Skill based Activity**	NCA-108	SK-01	1	0	1
	Total credits					**25**

***NCA- Nanded Campus Computer Application**

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
Second Semester						
1.	**Core Subjects**	NCA-201	Operating System Concepts	2	2	4
2		NCA-202	Introduction to Databases	2	2	4
3		NCA-203	Programming in Java	2	2	4
Choose any one from below elective subjects						
4	**Elective Subject**	NCA-204 A	System Analysis and Design	2	2	4
		NCA-204 B	Data Communications			
Practical /Lab						
5	**Lab / Practical**	NCA-205	Lab-3: DBMS	1	1	2
		NCA-206	Lab-4: Java programming	1	1	2
6	**Open Elective**	NCA-207A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR	4	0	4
		NCA-207 B	Social Media Technology			
7	**Skill based Activity**	NCA-208	SK-02	1	0	1
	Total credits					**25**

CBCS Revised Syllabus w.e.f AY: 2019-2020
Program: M.Sc.(Computer Application) – Campus School

CBCS Revised Syllabus w.e.f AY: 2019-2020
Program: M.Sc.(Computer Application) – Campus School

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
Third Semester						
1.	**Core Subjects**	NCA-301	Windows Programming	2	2	4
2		NCA-302	Advanced Databases and Administration	2	2	4
3		NCA-303	Computer Networking	2	2	4
Choose any one from below elective subjects						
4	**Elective Subject**	NCA-304 A	Data Sciences	2	2	4
		NCA-304 B	Introduction to Information Security			
Practical /Lab						
5	**Lab / Practical**	NCA-305	Lab-5: Windows Programming	1	1	2
		NCA-306	Lab-6: Advanced Databases	1	1	2
6	**Open Elective**	NCA-307A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR	4	0	4
		NCA-307 B	Linux Administration			
7	**Skill based Activity**	NCA-308	SK-03 : Seminar Presentation Activity	1	0	1
	Total credits					**25**

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
Fourth Semester						
1.	**Core Subjects**	NCA-401	Mobile Application Development	2	2	4
2		NCA-402	Introduction to Web Technologies	2	2	4
3		NCA-403	Major Project development Activity	0	4	4
Choose any one from below elective subjects						
4	**Elective Subject**	NCA-404 A	Internet of Things (IoT)	2	2	4
		NCA-404 B	Big Data Analytics			
Practical /Lab						
5	**Lab / Practical**	NCA-405	Lab-7: Mobile Application Development	1	1	2
		NCA-406	Lab-8: Web Technologies	1	1	2
6	**Open Elective**	NCA-407A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR	4	0	4
		NCA-407 B	Internetworking Protocols			
7	**Skill based Activity**	NCA-408	SK-04	1	0	1
	Total credits					**25**

CBCS Revised Syllabus w.e.f AY: 2019-2020
Program: M.Sc.(Computer Application) – Campus School

CBCS Revised Syllabus w.e.f AY:2019-2020
Program: M.Sc.(Computer Network) – Campus School

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
First Semester						
1.	**Core Subjects**	NCN-101	Computer System Organization	2	2	4
2		NCN-102	Computer Network	2	2	4
3		NCN-103	Database Management System	2	2	4
Choose any one from below elective subjects						
4	**Elective Subject**	NCN-104 A	Programming Language Concepts	2	2	4
		NCN-104 B	System Analysis and Design			
Practical /Lab						
5	**Lab / Practical**	NCN-105	Lab-1: Computer Network	1	1	2
		NCN-106	Lab-2: DBMS	1	1	2
6	**Open Elective**	NCN-107A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR	4	0	4
		NCN-107 B	Data Communications			
7	**Skill based Activity**	NCN-108	SK-01	1	0	1
	Total credits					**25**

***NCN- Nanded Campus Computer Network**

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
Second Semester						
1.	**Core Subjects**	NCN-201	Operating System Concepts	2	2	4
2		NCN-202	Elementary Data Structures and Algorithms	2	2	4
3		NCN-203	Programming in Java	2	2	4
Choose any one from below elective subjects						
4	**Elective Subject**	NCN-204 A	Wireless Networking	2	2	4
		NCN-204 B	Distributed Systems			
Practical /Lab						
5	**Lab / Practical**	NCN-205	Lab-3: Data Structures	1	1	2
		NCN-206	Lab-4: Java programming	1	1	2
6	**Open Elective**	NCN-207A	University recognized MOOC (NPTEL / SWAYAM / Others) OR Intra / Inter Departmental OR Intra / Inter School OR	4	0	4
		NCN-207 B	Cyber Forensics and Information Security			
7	**Skill based Activity**	NCN-208	SK-02	1	0	1
	Total credits					**25**

CBCS Revised Syllabus w.e.f AY:2019-2020
Program: M.Sc.(Computer Network) – Campus School

CBCS Revised Syllabus w.e.f AY:2019-2020
Program: M.Sc.(Computer Network) – Campus School

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
Third Semester						
1.	**Core Subjects**	NCN-301	Network Design and Analysis	2	2	4
2		NCN-302	Internetworking Protocols	2	2	4
3		NCN-303	Cloud Computing	2	2	4
Choose any one from below elective subjects						
4	**Elective Subject**	NCN-304 A	Switching and Routing	2	2	4
		NCN-304 B	Linux and Network Administration			
Practical /Lab						
5	**Lab / Practical**	NCN-305	Lab-5: Network Design and Analysis	1	1	2
		NCN-306	Lab-6: Linux Administration	1	1	2
6	**Open Elective**	NCN-307A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR	4	0	4
		NCN-307 B	Mobile Communications			
7	**Skill based Activity**	NCN-308	SK-03 : Seminar Presentation Activity	1	0	1
	Total credits					**25**

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
Fourth Semester						
1.	**Core Subjects**	NCN-401	Mobile Application Development	2	2	4
2		NCN-402	Introduction to Web Technologies	2	2	4
3		NCN-403	Major Project development Activity	0	4	4
Choose any one from below elective subjects						
4	**Elective Subject**	NCN-404 A	Internet of Things (IoT)	2	2	4
		NCN-404 B	Advanced Operating Systems			
Practical /Lab						
5	**Lab / Practical**	NCN-405	Lab-7: Mobile Application Development	1	1	2
		NCN-406	Lab-8: Web Technology	1	1	2
6	**Open Elective**	NCN-407A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR	4	0	4
		NCN-407 B	Client and Server Technology			
7	**Skill based Activity**	NCN-408	SK-04	1	0	1
	Total credits					**25**

CBCS Revised Syllabus w.e.f AY:2019-2020
Program: M.Sc.(Computer Network) – Campus School

Course Code:	**NCN-101**	**Course Name:** Computer System Organization	**Credits: 4**
Course Objectives:			

CBCS Revised Syllabus w.e.f AY: 2019-2020

Program: M.Sc.(Computer Science) (Campus) School of Computational Sciences

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
First Semester						
1.	**Core Subjects**	NCS-101	Computer System Organization	2	2	4
2		NCS-102	Introduction to Databases	2	2	4
3		NCS-103	Mathematical Foundations for Computer Science	2	2	4
Choose any one from below elective subjects						
4	**Elective Subject**	NCS-104 A	Programming Language Concepts	2	2	4
		NCS-104 B	Object Oriented Programming			
Practical /Lab						
5	**Lab / Practical**	NCS-105	Lab-1:DBMS	1	1	2
		NCS-106	Lab-2: OOP	1	1	2
6	**Open Elective**	NCS-107A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR	4	0	4
		NCS-107 B	Information Communication Technology (ICT)			
7	**Skill based Activity**	NCS-108	SK-01	1	0	1
	Total credits					**25**

***NCS- Nanded Campus Computer Science**

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
Second Semester						
1.	**Core Subjects**	NCS-201	Operating System Concepts	2	2	4
2		NCS-202	Elementary Data Structures and Algorithms	2	2	4
3		NCS-203	Programming in Java	2	2	4
Choose any one from below elective subjects						
4	**Elective Subject**	NCS-204 A	System Analysis and Design	2	2	4
		NCS-204 B	Data Communications			
Practical /Lab						
5	**Lab / Practical**	NCS-205	Lab-3: Data Structures	1	1	2
		NCS-206	Lab-4: Java Programming	1	1	2
6	**Open Elective**	NCS-207A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR	4	0	4
		NCS-207 B	Introduction to Linux			
7	**Skill based Activity**	NCS-208	SK-02	1	0	1
	Total credits					**25**

CBCS Revised Syllabus w.e.f AY: 2019-2020

Program: M.Sc.(Computer Science) (Campus) School of Computational Sciences

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
Third Semester						
1.	**Core Subjects**	NCS-301	Windows Programming	2	2	4
2		NCS-302	Computer Networks	2	2	4
3		NCS-303	Compiler Designing	2	2	4
Choose any one from below elective subjects						
4	**Elective Subject**	NCS-304 A	Data Sciences	2	2	4
		NCS-304 B	Digital Image Processing			
Practical /Lab						
5	**Lab / Practical**	NCS-305	Lab-5: Windows Programming	1	1	2
		NCS-306	Lab-6: Based on Elective Subjects	1	1	2
6	**Open Elective**	NCS-307A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR	4	0	4
		NCS-307 B	Introduction to Web Technologies			
7	**Skill based Activity**	NCS-308	SK-03: Seminar Presentation Activity	1	0	1
	Total credits					**25**

CBCS Revised Syllabus w.e.f AY: 2019-2020

Program: M.Sc.(Computer Science) (Campus) School of Computational Sciences

Sr. No	Course category	Course Code	Course Title	Internal credits	External credits	Total credits
Fourth Semester						
1.	**Core Subjects**	NCS-401	Mobile Application Development	2	2	4
2		NCS-402	Advanced Databases and Administration	2	2	4
3		NCS-403	Major Project development Activity	0	4	4
Choose any one from below elective subjects						
4	**Elective Subject**	NCS-404 A	Internet of Things (IoT)	2	2	4
		NCS-404 B	Big Data Analytics			
Practical /Lab						
5	**Lab / Practical**	NCS-405	Lab-7: Mobile Application Development	1	1	2
		NCS-406	Lab-8: Advanced Databases	1	1	2
6	**Open Elective**	NCS-407A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR	4	0	4
		NCS-407 B	Programming in Python			
7	**Skill based Activity**	NCS-408	SK-04	1	0	1
	Total credits					**25**

CBCS Revised Syllabus w.e.f AY: 2019-2020

Program: M.Sc.(Computer Science) (Campus) School of Computational Sciences