Department of MASTER OF COMPUTER APPLICATIONS

Board of Studies Meeting

For the Academic Year 2021-22

7th Board of Studies Meeting

Date: 15th JULY 2021

Time: 9:30 AM – 12:30 PM

Contents

Minutes of the BOS meeting

SCHEME

Scheme of III & IV Semesters for 2-Year MCA program (2021-22)

SYLLABUS

Syllabus of III & IV Semesters for 2-Year MCA program (2021-22)

New Horizon College of Engineering, Bangalore

Department of Master of Computer Applications

7th BOS Meeting for the A.Y 2021-22

AGENDA

Agenda 1:   Highlights of the MCA Programme (2-Year)

Agenda 2:   Scheme and Syllabus for 2020-2022 Batch

Agenda 3:   CO, PO, Credit and RBT level requirements and mapping verification

Agenda 4:   Focused courses (Core, Elective and Lab)

Agenda 5:   Innovative Ideas from Board Members

Agenda 6:   List of approved examiners for the academic year 2021-22

Agenda 7:   Approval for Digital Initiative.

 Agenda 8:   Suggestion for Open Source & Open Standard Practices

Agenda 9:   Recommendations of the Board

Agenda 10: Stakeholders feedback and considerations

BOARD OF STUDIES (2021-22)

S. No.	Academic Board	Structure/Constitution	Functions/Responsibilities	Frequency of Meetings
1	BOS	BOS Constituted with • Head of the Department as Chairman • Faculty members at different level with different specialization • Subject experts from outside the college nominated by academic council • Academic Expert from outside the college nominated by VTU • Representatives from Industry / Corporate sector / allied area related to placements, nominated by academic council • Post Graduate meritorious alumni nominated by Principal • Co-opted members with academic & research expertise.	• Recommendation and approval of curriculum-Scheme and Syllabus • Suggestions for incorporating new technologies / course • Removal of obsolete topics • To bridge the gap between industry and academia with supportive instructions and relevance • Validation and approval of course objectives and outcomes • Module-wise recommendation/ discussion/ suggestion for each proposed course of curriculum • Recommendations and approval of rubrics for evaluation.	Once in a year

- **BOS-CHAIRMAN**

Visvesvaraya Technological University

"Jnana Sangama", Belagavi - 590 018.

REGISTRAR

Phone: (0831) 2405468
Fax : (0831) 2405467

Ref No. VTU/Aca/A12/2020-21/ 787/8

Date: 1 8 JUN 2020

To,
Dr. Pravin Kumar Sinha
Senior Software Engineer,
Hortonworks Data Platform,
Bangalore

Sir,

Sub: Nomination to the Board of studies (Master of Computer Application) of New Horizon College of Engineering, Bengaluru (Autonomous) from 17-6-2020 to 17-6-2022.

Ref: Hon'ble Vice Chancellor's approval dated 17-6-2020

With reference to the above, I am pleased to nominate you as the Nominee of Visvesvaraya Technological University, Belagavi, to the "Board of Studies (Master of Computer Application)" of New Horizon College of Engineering, Bengaluru (Autonomous).

You are requested to accept the same and attend the meetings of the "Board of Studies (Master of Computer Application)" of the college as and when requested by the principal of the college and ensure that the views and guidelines of the University are duly taken into account in the deliberations and decisions of the Board of Studies.

Thanking you,

Yours faithfully,

REGISTRAR

Copy Fwc`s to:

The Principal, New Horizon College of Engineering, Bengaluru., with a request to send meeting notices of the Board of studies **Dr. Pravin Kumar Sinha**, from time to time. Please note that the TA/DA/Hospitality of V.T.U Nominee for attending Board of studies (Master of Computer Application) meetings have to be borne by your college.
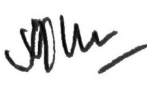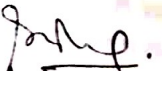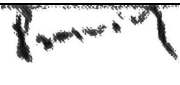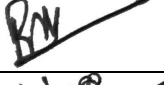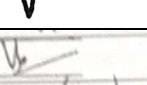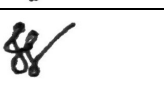
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11	**Agenda 7:** Approval for Digital Initiative.	**22**
12	**Agenda 8:** Suggestion for Open Source & Open Standard Practices.	**22**
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15	**Vote of thanks**	**28**

List of Members

S.No	Category	Name of the Person
1	Chairman – BOS	Dr. V. Asha, Professor and Head, Department of MCA, NHCE, Bangalore.
2	Dean Academics	Dr. Amarjeet Singh, Dean Academics, NHCE, Bangalore.
2	Subject Experts from outside the College nominated by Academic Council (VTU Nominee)	Mr. Pravin Kumar Sinha Staff Software Engineer, Cloudera, Bangalore.
3	Representative from Industry/ Corporate Sector / allied area relating to placements nominated by Academic Council	Dr. R. Balaji, Joint-Director, C-DAC, Bangalore.
		Prof. Gurucharan Singh, Executive Director, Department of HRD, NHCE.
4	Postgraduate Meritorious alumnus nominated by Principal	Mr. Vipul Kumar, Sr. Project Manager, OpenText , Bangalore.
5	Subject Experts from outside the College nominated by Academic Council	Dr. Jagannatha S Professor, Dept. of MCA, MSRIT, Bangalore.
		Dr. Vijaykumar K Professor, Dept of MCA, BMS College of Engineering, Bangalore.
6	Faculty members at different levels with different specializations	Dr.K.G.Madhwaraj
		Dr.A.P Nirmala
		Dr.B. Meenakshi Sundaram
		Dr. R. Sreekanth
		Prof. Sreeja
		Prof. Govinda Raju
7	Co-opted members	Prof. Vishwanatha
		Prof. Jincy C Mathew

List of Members Present

S.NO	NAME	SIGNATURE	S.NO	NAME	SIGNATURE
1.	Dr.V.Asha		9.	Dr.K.G.Madhwaraj	
2.	Dr. Amarjeet Singh		10.	Dr.A.P.Nirmala	
3.	Mr.Pravin Sinha		11.	Dr.B.Meenakshi Sundaram	
4.	Dr.R.Balaji		12.	Dr. R. Sreekanth	
5.	Dr. Jagannatha S		13.	Mrs. Sreeja S P	
6.	Dr. Vijayakumar Kadappa		14.	Mr. Govindaraj M	
7.	Mr.Vipul Kumar		15.	Mr. Vishwanath CR	
8.	Prof. Gurucharan Singh		16.	Mrs. Jincy C Mathew	

WELCOME ADDRESS AND INTRODUCTION OF MEMBERS

The Board of Studies meeting was held on Thursday, 15th July 2021 at 9:30 AM in the Department of MCA (online).

Chairman Dr. V. Asha, Head of the Department, Dept of MCA welcomed all the members of BOS.

Dr. K.G. Madhwaraj, Professor, MCA department introduced all the external experts of the BOS.

Chairman BOS presented the 2-Year MCA program Semester 3 & 4 for 25 + 25 credits with its new curriculum structure and detailed autonomous syllabus contents.

Then the forum was open for discussion. Every member contributed enthusiastically to the discussion.

AGENDA 1: Highlights of the MCA Programme

1. Academic strength

2. Learning Infrastructure

3. Technical strengths of curriculum

4. Industry Academia Interaction

5. Opportunities to demonstrate technical expertise

6. Generating and enabling creativity

7. Faculty resources

8. Trending Value-Added Programs

AGENDA 2: Scheme and Syllabus

2-YEAR MCA DEGREE CURRICULUM – CREDIT DISTRIBUTION TABLE

FOR THE 2020-21 BATCH ONWARDS (100 CREDITS)

SEMESTER I TO IV

SEMESTER	CORE	ELECTIVE	MINI/ PROJECT WORKS	SEMINAR	TOTAL CREDITS
I	25	0	0	0	25
II	17	6	2	0	25
III	11	12	2	0	25
IV	0	2	21	2	25
TOTAL	53	20	25	2	100
% of Distribution	53%	20%	25%	2%	100%
% of Requirements as per VTU guidelines	40-55	20-35	20-35	02-10	

Scheme of I Semester for 2-Year MCA program (2021-22)

DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS
SCHEME - FIRST SEMESTER MCA PROGRAM

S NO	COURSE CODE	COURSE	BOS	CREDIT DISTRIBUTION				OVERALL CREDITS	CONTACT HOURS WEEKLY	MARKS		
				L	T	P	S			CIE	SEE	TOTAL
1	20MCA11	PROGRAMMING WITH JAVA	MCA	4	0	0	0	4	4	50	50	100
2	20MATC12	COMPUTATIONAL MATHEMATICS	MAT	3	1	0	0	4	5	50	50	100
3	20MCA13	OPERATING SYSTEM WITH UNIX PROGRAMMING	MCA	4	0	0	0	4	4	50	50	100
4	20MCA14	COMPUTER NETWORKS	MCA	4	0	0	0	4	4	50	50	100
5	20MCA15	WEB PROGRAMMING	MCA	3	0	0	0	3	3	50	50	100
6	20MCA16*	PROGRAMMING LOGIC AND DESIGN	MCA	0	0	0	0	0	4	50	50	100
7	20MCAL17	JAVA LAB	MCA	0	0	1.5	0	1.5	3	25	25	50
8	20MCAL18	UNIX LAB	MCA	0	0	1.5	0	1.5	3	25	25	50
9	20MCAL19	COMPUTER NETWORKS LAB	MCA	0	0	1	0	1	2	25	25	50
10	20MCAL110	WEB PROGRAMMING LAB	MCA	0	0	1	0	1	2	25	25	50
11	20HSSC111A	LIFE SKILLS FOR PROFESSIONALS -1	HSS	1	0	0	0	1	2	25	25	50
		TOTAL		19	1	5	0	25	36	425	425	850
L -Lecture (1 hour), T- Tutorial (2 hours), P-Practical (2 hours) *Mandatory non-credit Bridge Course only for non-computer science students												

Scheme of II Semester for 2-Year MCA program (2021-22)

DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS
SCHEME -SECOND SEMESTER MCA PROGRAM

S NO	COURSE CODE	COURSE	BOS	CREDIT DISTRIBUTION				OVERALL CREDITS	CONTACT HOURS WEEKLY	MARKS		
				L	T	P	S			CIE	SEE	TOTAL
1	20MCA21	ADVANCED JAVA AND ENTERPRISE ARCHITECTURE	MCA	3	0	0	0	3	3	50	50	100
2	20MCA22	DATA STRUCTURES USING C++	MCA	2	1	0	0	3	4	50	50	100
3	20MCA23	SOFTWARE ENGINEERING AND TESTING	MCA	3	0	0	0	3	3	50	50	100
4	20MCA24	DATABASE SYSTEMS	MCA	3	0	0	0	3	3	50	50	100
5	20MCA25X	ELECTIVES-1	MCA	3	0	0	0	3	3	50	50	100
6	20MCA26X	ELECTIVES-2	MCA	3	0	0	0	3	3	50	50	100
7	20MCAL27	ADVANCED JAVA LAB	MCA	0	0	1.5	0	1.5	3	25	25	50
8	20MCAL28	DATA STRUCTURES USING C++ LAB	MCA	0	0	1.5	0	1.5	3	25	25	50
9	20MCAL29	SOFTWARE TESTING LAB	MCA	0	0	1	0	1	2	25	25	50
10	20MCAL210	DATABASE SYSTEMS LAB WITH MINI PROJECT	MCA	0	0	2	0	2	3	25	25	50
11	20HSSC211A	LIFE SKILLS FOR PROFESSIONALS -2	HSS	1	0	0	0	1	3	25	25	50
TOTAL				18	1	6	0	25	33	425	425	850
L -Lecture (1 hour), T- Tutorial (2 hours), P-Practical (2 hours)												

ELECTIVES-1 (BUSINESS ANALYTICS TRACK)								
SNO	COURSE CODE	COURSE	BOS	CREDIT DISTRIBUTION				TOTAL
				L	T	P	S	
1	20MCA251	DATA WAREHOUSING AND DATA MINING	MCA	3	0	0	0	3
2	20MCA252	ROBOTIC PROCESS AUTOMATION	MCA	3	0	0	0	3
3	20MCA253	ENTERPRISE RESOURCE PLANNING	MCA	3	0	0	0	3
4	20MCA254	BUSINESS INTELLIGENCE AND DATA ANALYTICS	MCA	3	0	0	0	3
5	20MCA255	COMPUTATIONAL STATISTICS	MCA	3	0	0	0	3

ELECTIVES-2 (NETWORK SECURITY TRACK)								
SNO	COURSE CODE	COURSE	BOS	CREDIT DISTRIBUTION				TOTAL
				L	T	P	S	
1	20MCA261	CYBER SECURITY AND CYBER LAW	MCA	3	0	0	0	3
2	20MCA262	DIGITAL FORENSICS	MCA	3	0	0	0	3
3	20MCA263	CRYPTOGRAPHY AND NETWORK SECURITY	MCA	3	0	0	0	3
4	20MCA264	INFORMATION RETRIEVAL AND SECURITY	MCA	3	0	0	0	3
5	20MCA265	WIRELESS SENSOR NETWORKS	MCA	3	0	0	0	3

Scheme of III Semester for 2-Year MCA program (2021-22)

DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS
SCHEME - THIRD SEMESTER MCA PROGRAM

S NO	COURSE CODE	COURSE	B O S	CREDIT DISTRIBUTION				OVERALL CREDITS	CONTACT HOURS WEEKLY	MARKS		
				L	T	P	S			CIE	SEE	TOTAL
1	20MCA31A	DESIGN AND ANALYSIS OF ALGORITHMS	MCA	4	0	0	0	4	4	50	50	100
2	20MCA32A	MACHINE LEARNING TECHNIQUES	MCA	4	0	0	0	4	4	50	50	100
3	20MCA33XA	ELECTIVE - 3	MCA	4	0	0	0	4	4	50	50	100
4	20MCA34XA	ELECTIVE - 4	MCA	4	0	0	0	4	4	50	50	100
5	20MCA35XA	ELECTIVE - 5	MCA	4	0	0	0	4	4	50	50	100
7	20MCAL36A	PYTHON PROGRAMMING LAB	MCA	0	0	1.5	0	1.5	3	25	25	50
8	20MCAL37A	BIGDATA ANALYTICS LAB	MCA	0	0	1.5	0	1.5	3	25	25	50
9	20MCA38A	MINI PROJECT (IOT/CLOUD/PYTHON/ML)	MCA	0	0	2	0	2	4	25	25	50
		TOTAL		20	0	5	0	25	30	325	325	650
L -Lecture (1 hour), T- Tutorial (2 hours), P-Practical (2 hours)												

ELECTIVE-3 (AI TRACK)								
SNO	COURSE CODE	COURSE	BOS	CREDIT DISTRIBUTION				TOTAL
				L	T	P	S	
1	20MCA331A	DATA SCIENCE	MCA	4	0	0	0	4
2	20MCA332A	DEEP LEARNING	MCA	4	0	0	0	4
3	20MCA333A	REINFORCEMENT LEARNING	MCA	4	0	0	0	4
4	20MCA334A	NEURAL NETWORKS	MCA	4	0	0	0	4
5	20MCA335A	ARTIFICIAL INTELLIGENCE	MCA	4	0	0	0	4

ELECTIVE-4 (COMPUTING SERVICES TRACK)								
SNO	COURSE CODE	COURSE	BOS	CREDIT DISTRIBUTION				TOTAL
				L	T	P	S	
1	20MCA341A	CLOUD COMPUTING	MCA	4	0	0	0	4
2	20MCA342A	GRID AND HIGH PERFORMANCE COMPUTING	MCA	4	0	0	0	4
3	20MCA343A	MICROSERVICES ARCHITECTURE	MCA	4	0	0	0	4
4	20MCA344A	SOCIAL MEDIA ANALYTICS	MCA	4	0	0	0	4
5	20MCA345A	AUGMENTED REALITY AND VIRTUAL REALITY	MCA	4	0	0	0	4

ELECTIVE-5 (RECENT TRENDS TRACK)								
SNO	COURSE CODE	COURSE	BOS	CREDIT DISTRIBUTION				TOTAL
				L	T	P	S	
1	20MCA351A	INTERNET OF EVERYTHING	MCA	4	0	0	0	4
2	20MCA352A	MOBILE APPLICATION DEVELOPMENT	MCA	4	0	0	0	4
3	20MCA353A	BLOCKCHAIN TECHNOLOGIES	MCA	4	0	0	0	4
4	20MCA354A	FULL STACK DEVELOPMENT TOOLS	MCA	4	0	0	0	4
5	20MCA355A	COMPUTER VISION	MCA	4	0	0	0	4

Scheme of IV Semester for 2-Year MCA program (2021-22)

DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS
SCHEME OF FOURTH SEMESTER MCA PROGRAM

S NO	COURSE CODE	COURSE	BOS	CREDIT DISTRIBUTION				OVERALL CREDITS	CONTACT HOURS WEEKLY	MARKS		
				L	T	P	S			CIE	SEE	TOTAL
1	20MCA41A	INDUSTRY INTERNSHIP / PROJECT WORK	MCA	0	0	21	0	21	-	150	150	300
2	20MCA42A	RESEARCH / TECHNICAL SEMINAR	MCA	0	0	0	2	2	-	25	25	50
3	20MCA43XA	ELECTIVE - 6	MCA	2	0	0	0	2	2	25	25	50
		TOTAL		2	0	21	2	25	2	200	200	400
		L -Lecture (1 hour), T- Tutorial (2 hours), P-Practical (2 hours)										

SNO	COURSE CODE	ELECTIVE-6 (INNOVATION AND MANAGEMENT TRACK)						
		COURSE	BOS	CREDIT DISTRIBUTION				TOTAL
				L	T	P	S	
1	20MCA431A	DESIGN THINKING	MCA	2	0	0	0	2
2	20MCA432A	RESEARCH METHODOLOGY & IPR	MCA	2	0	0	0	2
3	20MCA433A	ENTREPRENEURSHIP AND INNOVATION MANAGEMENT	MCA	2	0	0	0	2
4	20MCA434A	PROFESSIONAL ETHICS	MCA	2	0	0	0	2
5	20MCA435A	ECONOMICS FOR SOFTWARE ENGINEERS	MCA	2	0	0	0	2

3-YEAR MCA DEGREE CURRICULUM – CREDIT DISTRIBUTION TABLE

FOR THE 2021-22 ACADAMIC YEAR (132 CREDITS)

SEMESTER I TO VI

SEMESTER	CORE	ELECTIVE	MINI/ PROJECT WORKS	SEMINAR	TOTAL CREDITS
I	22	0	0	0	22
II	20	0	2	0	22
III	12	6	2	2	22
IV	9	9	2	2	22
V	10	12	3	0	25
VI	0	0	17	2	19
TOTAL	73	27	26	6	132
% of Distribution	55	20	20	5	
% of Requirements as per VTU guidelines	40-55	20-35	20-35	02-10	

Scheme of V Semester for 3-Year MCA program (2021-22)

DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS
SCHEME - FIFTH SEMESTER MCA PROGRAM

S NO	COURSE CODE	COURSE	BOS	CREDIT DISTRIBUTION				OVERALL CREDITS	CONTACT HOURS WEEKLY (THEORY)	MARKS		
				L	T	P	S			CIE	SEE	TOTAL
1	20MCA51	PROGRAMMING USING C#.NET	MCA	4	0	0	0	4	4	50	50	100
2	20MCA52	SOFTWARE QUALITY & TESTING	MCA	3	0	0	0	3	3	50	50	100
3	20MCA53X	ELECTIVES – 6	MCA	4	0	0	0	4	4	50	50	100
4	20MCA54X	ELECTIVES – 7	MCA	4	0	0	0	4	4	50	50	100
5	20MCA55X	ELECTIVES – 8	MCA	4	0	0	0	4	4	50	50	100
6	20MCAL56	PROGRAMMING USING C#.NET LAB	MCA	0	0	1.5	0	1.5	3	25	25	50
7	20MCAL57	SOFTWARE QUALITY AND TESTING LAB	MCA	0	0	1.5	0	1.5	3	25	25	50
8	20MCA58	MINI PROJECT USING .NET, C# AND SOFTWARE TESTING	MCA	0	0	3	0	3	-	50	50	100
TOTAL				19	0	6	0	25	25	350	350	700
L -Lecture (1 hour), T-Tutorial (2 hours), P-Practical (2 hours) *Non credit Mandatory course												

<table>
<tr><td colspan="10" align="center">**ELECTIVE-6**</td></tr>
<tr><td rowspan="2">**SNO**</td><td rowspan="2">**COURSE CODE**</td><td rowspan="2">**COURSE**</td><td rowspan="2">**BOS**</td><td colspan="4" align="center">**CREDIT DISTRIBUTION**</td><td rowspan="2">**TOTAL**</td></tr>
<tr><td>**L**</td><td>**T**</td><td>**P**</td><td>**S**</td></tr>
<tr><td>1</td><td>20MCA531</td><td>DATA SCIENCE</td><td>MCA</td><td>4</td><td>0</td><td>0</td><td>0</td><td>4</td></tr>
<tr><td>2</td><td>20MCA532</td><td>OBJECT ORIENTED MODELLING AND DESIGN</td><td>MCA</td><td>4</td><td>0</td><td>0</td><td>0</td><td>4</td></tr>
<tr><td>3</td><td>20MCA533</td><td>PATTERN RECOGNITION</td><td>MCA</td><td>4</td><td>0</td><td>0</td><td>0</td><td>4</td></tr>
<tr><td>4</td><td>20MCA534</td><td>PARALLEL PROGRAMMING</td><td>MCA</td><td>4</td><td>0</td><td>0</td><td>0</td><td>4</td></tr>
<tr><td>5</td><td>20MCA535</td><td>SEARCH ENGINE OPTIMIZATION</td><td>MCA</td><td>4</td><td>0</td><td>0</td><td>0</td><td>4</td></tr>
<tr><td colspan="10" align="center">**ELECTIVE-7**</td></tr>
<tr><td rowspan="2">**SNO**</td><td rowspan="2">**COURSE CODE**</td><td rowspan="2">**COURSE**</td><td rowspan="2">**BOS**</td><td colspan="4" align="center">**CREDIT DISTRIBUTION**</td><td rowspan="2">**TOTAL**</td></tr>
<tr><td>**L**</td><td>**T**</td><td>**P**</td><td>**S**</td></tr>
<tr><td>1</td><td>20MCA541</td><td>WEB DESIGN AND HTML5</td><td>MCA</td><td>4</td><td>0</td><td>0</td><td>0</td><td>4</td></tr>
<tr><td>2</td><td>20MCA542</td><td>BIG DATA ANALYTICS USING HP VERTICA</td><td>MCA</td><td>4</td><td>0</td><td>0</td><td>0</td><td>4</td></tr>
<tr><td>3</td><td>20MCA543</td><td>INFORMATION RETRIEVAL AND SECURITY</td><td>MCA</td><td>4</td><td>0</td><td>0</td><td>0</td><td>4</td></tr>
<tr><td>4</td><td>20MCA544</td><td>PERVASIVE COMPUTING</td><td>MCA</td><td>4</td><td>0</td><td>0</td><td>0</td><td>4</td></tr>
<tr><td>5</td><td>20MCA545</td><td>ECONOMICS FOR SOFTWARE ENGINEERS</td><td>MCA</td><td>4</td><td>0</td><td>0</td><td>0</td><td>4</td></tr>
<tr><td colspan="10" align="center">**ELECTIVE-8**</td></tr>
<tr><td rowspan="2">**SNO**</td><td rowspan="2">**COURSE CODE**</td><td rowspan="2">**COURSE**</td><td rowspan="2">**BOS**</td><td colspan="4" align="center">**CREDIT DISTRIBUTION**</td><td rowspan="2">**TOTAL**</td></tr>
<tr><td>**L**</td><td>**T**</td><td>**P**</td><td>**S**</td></tr>
<tr><td>1</td><td>20MCA551</td><td>MACHINE LEARNING TECHNIQUES</td><td>MCA</td><td>4</td><td>0</td><td>0</td><td>0</td><td>4</td></tr>
<tr><td>2</td><td>20MCA552</td><td>CRYPTOGRAPHY AND NETWORK SECURITY</td><td>MCA</td><td>4</td><td>0</td><td>0</td><td>0</td><td>4</td></tr>
<tr><td>3</td><td>20MCA553</td><td>MIDDLEWARE TECHNOLOGIES</td><td>MCA</td><td>4</td><td>0</td><td>0</td><td>0</td><td>4</td></tr>
<tr><td>4</td><td>20MCA554</td><td>PRINCIPLES OF DISTRIBUTED SYSTEMS</td><td>MCA</td><td>4</td><td>0</td><td>0</td><td>0</td><td>4</td></tr>
<tr><td>5</td><td>20MCA555</td><td>SYSTEM SIMULATION AND MODELING</td><td>MCA</td><td>4</td><td>0</td><td>0</td><td>0</td><td>4</td></tr>
</table>

Scheme of VI Semester for 3-Year MCA program (2021-22)

DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS
SCHEME OF SIXTH SEMESTER MCA PROGRAM

S NO	COURSE CODE	COURSE	BOS	CREDIT DISTRIBUTION				OVERALL CREDITS	CONTACT HOURS WEEKLY	MARKS		
				L	T	P	S			CIE	SEE	TOTAL
1	20MCA61	INTERNSHIP PROJECT	MCA	0	0	17	0	17	-	150	150	300
2	20MCA62	SEMINAR - 2	MCA	0	0	0	2	02	-	50	50	100
		TOTAL		0	0	17	2	19	-	200	200	400
L -Lecture (1 hour), T- Tutorial (2 hours), P-Practical (2 hours) *Non credit Mandatory course												

AGENDA 3: CO, PO, Credit and RBT levels requirements and mapping verification

There are 11 Program Outcomes (PO's) that are defined and mapped in NHCE MCA program.

S.NO	Graduate Attributes	Program Outcomes (POs)
1.	Scholarship of Knowledge	**PO1:** Understand and apply the fundamental principles of mathematics, science, knowledge of computer science for solving complex problems.
2.	Critical Thinking	**PO2:** Identify, analyze, and formulate the real world requirements in computing
3.	Problem Solving	**PO3:** Design and estimate the computer system components, sub-systems and appropriate tools for developing solutions for complex problems.
4.	Research Skill	**PO4:** Use latest tools and technique needed for hard computing practices.
5.	Usage of modern tools	**PO5:** Use right platform on design and execution for performance.
6.	Collaborative and Multidisciplinary	**PO6:** Customize and fit software solutions to the society and environment.
7.	Project Management and	**PO7:** Work effectively as an individual as well as a member / leader in a team.
8.	Communication	**PO8:** Understand and commit ethical, cyber regulations and management practices in computing field for managing software projects from diverse environments.
9.	Life-long Learning	**PO9:** Understand the societal, environmental, health, legal, ethical issues and its impact with respect to computing and professional practice.
10.	Ethical Practices and Social Responsibility	**PO10:** Discover openings and use novel thoughts for creating value and wealth for the betterment of the individual and society.
11.	Independent and Reflective Learning	**PO11:** Design, execute and interpret the software with real time data and synthesis the information to reach suitable conclusions.

The aforementioned POs are mapped with the Course Outcomes in each course (CO) by using the following mapping table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	3	-	-	-	-	-	-	-	-
CO2	3	-	3	3	2	-	-	-	-	-	-
CO3	3	-	3	3	2	-	-	-	-	-	-
CO4	3	-	3	-	-	-	-	-	-	-	2
CO5	3	-	3	3	-	-	-	-	-	-	2
CO6	3	2	-	-	-	-	-	-	-	-	2

The correlated values 3, 2 and 1 refer the degree of correlation of the CO-PO mapping. The enumerated values are labelled as High (3), Medium (2), and Low (1).

The Co's are written using Revised Bloom's Taxonomical (RBT) levels to ensure the attainment.

The course outcomes are well-written in terms of cognitive levels (Level 1 to 6)

- ❑ Level 1 – Remember
- ❑ Level 2 – Understand
- ❑ Level 3 – Apply
- ❑ Level 4 – Analyze
- ❑ Level 5 – Evaluate
- ❑ Level 6 – Create

Every course CO-PO mappings were verified by both the faculty members and expert members of the BOS.

CREDITS STANDARDS

- ❖ III – Semester (L:T:P structure)

    - CORE   – 4:0:0   = 4+0+0   = 4 credits

    - ELECTIVE   – 4:0:0   = 4+0+0   = 4 credits

    - LAB   – 0:0:1.5   = 0+0+1.5 = 1.5 credits

    - MINI PROJECT   – 0:0:2   = 0+0+2   = 2 credits

- ❖ IV – Semester (L:T:P structure)

    - INTERNSHIP / PROJECT   – 0:0:21 = 21 credits

    - SEMINAR   – 0:0:2   = 2 credits

    - ELECTIVE   –2:0:0   = 2 credits

AGENDA 4: Focused courses in the proposed Scheme

- ❖ Machine Learning skills & Analysis and Design of Algorithms are essential for employability; therefore these courses have been made as a core.

- ❖ ELECTIVE-3 (AI TRACK)

- ❖ ELECTIVE-4 (COMPUTING SERVICES TRACK)

- ❖ ELECTIVE-5 (RECENT TRENDS TRACK)

- ❖ ELECTIVE-6 (INNOVATION AND MANAGEMENT TRACK)

- ❖ PYTHON PROGRAMMING - PART-A (Basics) & PART-B (ML Programs)

- ❖ BIG DATA ANALYTICS - Hands-on practices using HP Vertica

    In the above two lab courses, the theoretical concepts will be taught along with lab experiments.

AGENDA 5: Innovative Ideas from Board Members

The Board of Members gave many ideas and suggestions with their enthusiastic involvement. The suggestions by Mr. Pravin Kumar Sinha (1), VTU Nominee (2020-22) is as follows:

Elective 4 has both "Cloud Computing" and Microservice Architecture. Companies often develop micro services and deploy them on Cloud. I was wondering if we should shift "Microservice Architecture" to elective 5 and move "Full Stack Development tool" or something else to Elective 4.

| ELECTIVES – 4 |
| • FULL STACK DEVELOPMENT TOOLS |

| ELECTIVES – 5 |
| • MICROSERVICES ARCHITECTURE |
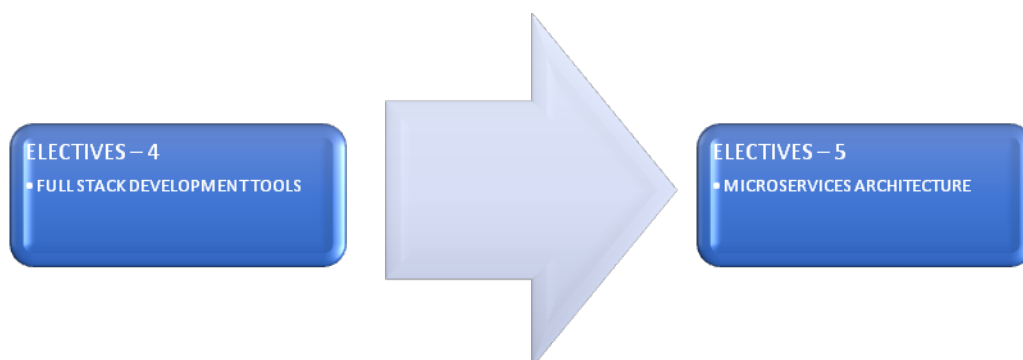
Excellent suggestions, the comments are accepted and will be incorporated, so that the students can opt for both "Cloud Computing" and "Microservices Architecture".

The suggestions by Dr. S. Jagannatha (2), Professor, MSRIT, Bangalore, are as follows:

The new machine learning textbooks can be added with the curriculum.

1. *Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das: Machine Learning, 2019*

2. *Pang-Ning Tan, Michael Steinbach, and Vipin Kumar: Introduction to Data Mining, 2nd Edition, Pearson Education, 2006./references*

Excellent suggestions, the comments are accepted and will be added these books with the reference texts.

21MCA341 – CLOUD COMPUTING:

HANDS-ON practices are added from Unit-2 to Unit-5.

- *Creating a word document and store on the cloud.*
- *Creating an account in AWS and working with AWS, Launching an Instance with AMI.*
- *Install a C compiler on the virtual machine and execute a sample program.*
- *Installation and Working with GAE.*

From placement aspects, Prof. Gurucharan Singh contributed to the BOS by giving his valuable comments that full-stack developer skills are essential for employability.

AGENDA 6: List of Approved Examiners for the Academic Year 2021-22

The BoS members approved the following list of examiners for the academic year 2021-22.

Sl.No.	Name/Designation/Complete Address
1	Prof. Lakshmi Narayan B N/ Asst. professor/ Nitte Meenakshi, Bangalore
2	Prof. Diwakar/ Asst. Professor/ Cambridge Institute of Technology K.R. Puram, Bangalore – 560036
3	Prof. Vasanth C Bhagawat/ Assoc. Prof.,/ AMC Engineering College, Dept. of MCA,18th K.M. Bannerghatta Main Road, Bengaluru, Karnataka 560083
4	Prof. Vijayalakshmi/ Asst. Professor/ Cambridge Institute of Technology K.R. Puram, Bangalore – 560036
5	Prof. Divya TL/Assistant Professor,Department of MCA/RV College of Engineering, Mysore Road, Bengaluru
6	Prof. S.P. Srikanth/Assistant Professor/Department of CSE, Sambhram Institute of Technology, Bengaluru
7	Prof. Bhavana K/ASC Degree College, Department of BCA, Bangalore
8	Prof. Dharamvir, Assistant Professor, The Oxford College of Engineering, Bommanahalli, Hosur Road, Bengaluru- 560 068
9	Prof. Rajesh, Assistant Professor, AMC Engineering College, Bannerghatta Road, Bengaluru - 560 083

10	Dr. G. Komarasamy / Associate Professor / Department of CSE, School of Engineering and Technology, Jain University, Bangalore- 562112
11	Dr. Mouleeswaran / Associate Professor / Department of CSE, Dayananda sagar University, Kudlu gate, Hongasandra village, Hosur main Road, Bangalore- 560068
12	Prof. Sindhu S,Assistant Professor, Department of MCA, Cambridge Institute of Technology, Jai Bhuvaneshwari Layout Rd, SR Layout, Chikkabasavanapura, Krishnarajapura, Bengaluru, Karnataka 560036
13	Prof. V.L. Helen Josephine, Department of MCA, CMR Institute of Technology, 132 AECS Layout ITPL Main Road, Kundalahalli Bangalore 560037
14	Prof. Mariyan Richard A,, Department of MCA, Nitte Meenakshi Insitute of Technology, Bangalore
15	Prof. Vibha M B, Asst.Prof. Dayananda Sagar College of Engineering, Shavige Malleshwara Hills, 1st Stage, Kumaraswamy Layout, Bengaluru

AGENDA 7: Approval for Digital Initiative

I.   SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) –

    a.   ONE NPTEL MOOC course (Joy of computing using PYTHON) will be a mandatory requirement for III semester students (2020-22 Batch).

II. V-Labs (Virtual Labs): used for additional learning for core & elective courses. (https://www.vlab.co.in/broad-area-computer-science-and-engineering)

III. NATIONAL DIGITAL LIBRARY OF INDIA (NDL INDIA) – All faculty members of department are registered with NDL for accessing additional teaching/learning resources.

IV. VIDWAN: All faculty members of the department are registered with Vidwan portal. The same id is used for applying for funded projects and proposals.

V.   NIRF: NHCE has been Ranked 114 amongst the Top Engineering Colleges across India, as per the National Institutional Ranking Framework (NIRF 2020) Rankings, announced by MHRD, Govt. of India.

AGENDA 8: Suggestion for Open Source & Open Standard Practices

❖ SEMESTER-3

    I.   PYTHON and R

    II. Hadoop, Sqoop, Pig & Hive

    III. PHP & MySQL

AGENDA 9: Recommendations of the Board

Many recommendations were received from external BoS members. The comments were accepted and incorporated in the scheme and syllabus.

From Mr. Pravin Kumar Sinha, VTU Nominee

Recommendation-1

a) Elective 4 have both "Cloud Computing" and Microservice Architecture. Companies often develop micro services and deploy them on Cloud. I was wondering if we should shift "Microservice Architecture" to elective 5 and move "Full Stack Development tool" or something else to Elective 4.

In that way students can opt for both "Cloud Computing" and "Microservice Architecture".

The comments are accepted and incorporated, so that the students can opt for both "Cloud Computing" and "Microservices Architecture".

Recommendation-2

b) 20MCA36 - BIG DATA ANALYTICS LAB: This is proposed to be of 1.5 credits. I don't see a theory course backing this. Is 1.5 credit of only the practical session going to suffice?

Since the MCA program duration is scaled down to 2 Yrs by AICTE, the number of subjects are more in each semester, thereby few courses are offered as pure laboratory courses (hands-on) with sufficient theory of learning with little less credits.

Dr.R.Balaji, J-Director, C-DAC, Bangalore

Recommendation-3

Semester III seems to be loaded with electives. If it is possible to balance between core subjects and electives, it may be better.

Since all foundation/essential courses are considered as core and they are offered in the 1st and 2nd semesters, thereby 3rd semester is with 3 electives and 2 core courses. However, the core and elective courses are balanced among other semesters.

Recommendation-4

Some electives in Elective-3 and Elective-5 group are much broader subjects - like AI and Computer Vision respectively, while subjects like Reinforcement Learning are very specialized and require conceptual background. So adequate basics may be covered in those electives.

Very nice suggestions, It is incorporated in the course contents. We assure, adequate basics are covered in the primary units of such electives.

Recommendation-5

In Projects, Point no.2, "Project should be real time work, for total of 6 months duration" does real time, mean full time? If we are really talking of real-time applications, there are some very high quality simulated / emulated projects also. So, this may be taken care.

The corrections are incorporated, instead of real-time; we will replace it as 'high quality simulated application projects'.

Dr. S. Jagannatha, Professor, MSRIT, Bangalore

Recommendation-6

In DAA/ADA - Heaps and Heap sort may be introduced in DAA by removing B-trees if covered in DS.

In DS, Heaps and Heap sort are added, so it is removed in ADA and added B-trees.

Recommendation-7

Data Science: - Syllabus may be revised.

FULL STACK DEVELOPMENT TOOLS: - revise unit 1 and unit 2 (condense)

Suggestions are incorporated as per the expert comments.

Recommendation-8

Cloud computing: Taught by Hands-on: Programming on Amazon EC2, Amazon Simple Storage Service S3, Amazon Elastic Block Store EBS and SimpleDB.

Discussed with Dr.S.Jagannatha and taken his inputs for the inclusion of required hands-on practices in the respective units.

Dr. Vijayakumar Kadappa, Associate Professor, BMSCE, Bangalore.

Recommendation-9

1. In many courses, COs are to be revised based on action verbs of Blooms taxonomy and skills to be imparted to students

2. For Research Seminar, detailed guidelines may be brought out.

3. In many courses, each CO is mapped to too many PO's. This may be relooked into.

All these suggestions are incorporated as per the expert comments.

Recommendation-10

Keeping a theory course in 4th sem. is not a good idea since many companies ask for full time work, and students can concentrate better on project work to get a job.

VTU has added 2-core courses in IV semester, so light-weight electives are added with 2hrs/wk. However the classes will be conducted during weekend only, which won't disturb the Internship work. All these elective courses are required from the research and employability perspectives.

AGENDA 10: Stakeholders feedback and considerations

Student's feedback & exit survey comments, Faculty member's course feedback, PTM comments and External expert member's comments are incorporated into the BoS decisions to make the curriculum complaint free.

- Student's course feedback – taken every academic semester for all individual courses through feedback link shared from Library & Information Centre, NHCE.
- Exit Survey taken from graduating students while leaving the campus, which recollects about the infrastructure, curriculum, placement opportunities and other facilities.
- Faculty course feedback taken from the individual faculty members who taught the course in the academic semesters. The pros & cons in the content, mode of delivery etc were taken and considered.
- PTM meeting is held twice in a year (interim period of odd and even semesters). The faculty coordinator records and minutes the remarks received and taken the same for BoS decisions.

Vote of thanks

BOS – Chairman consolidated the recommendations proposed by the BOS members.

It was assured that the proposed changes will be incorporated in the syllabus and scheme of A.Y: 2021-22 (3rd & 4th Semesters).

Recommendations were accepted online by every member of the BOS.

Vote of thanks was proposed by the Dr. B. Meenakshi Sundaram, Associate Professor, MCA Department.

He conveyed his heartfelt thanks to all the members of BoS and stakeholders for their valuable inputs to make this program a value-added program.

Annexure-1: Detailed syllabus and scheme of 3rd & 4th Semester (2021-22) after incorporating the recommendations made by the Board.

Annexure-2: Percentage of syllabus change as compared to last BOS (2020-21).

Annexure-3: Proposed subject name and new subject code (After BOS) whose subject topics changed (2021-22)