Symbiosis Institute of Computer Studies and Research, Pune
Bachelor of Computer Applications (Honours)
Proposed Programme Structure 2021-24

1.	OBJECTIVE	BCA offers the prequalification for professionals heading for smart career in the IT field, which measures up to international standards. On completing this course one can do higher studies in any UGC recognized universities or in any other reputed institution in India or abroad. BCA (Honours) with specialization will prepare students to progress their career in the software industry, academia, research, entrepreneurial pursuit and other Information technology enabled services in one of the area in Data Science, Artificial Intelligence and Machine Learning, Cloud Computing , and Data security.			
2.	DURATION (IN MONTHS)	36 (Full Time)			
3.	INTAKE	180			
4.	RESERVATION	I.Within the sanctioned intake	a) SC (In Percentage)	b) ST (In Percentage)	c) Differently abled (In Percentage)	d) Defence (In Percentage)
			15	7.5	3	5
		II. Over and above the sanctioned intake	a) Kashmiri Migrants (In Seats)		b) International Students (In Percentage)	
			2		15	
5.	ELIGIBILITY	The Bachelor of Computer Applications (Honours) with specializations will be offered to the meritorious students of the first year students of existing BCA programme on completion of additional 24 credits. Students with Pending Backlog (due to any reason) will not be admitted to the 'Degree with Honours' Programme.			
6.	SELECTION PROCEDURE	Symbiosis Entrance Test, Personal Interaction and Writing Ability Test (PI-WAT)			
7.	MEDIUM OF INSTRUCTION	English			
8.	PROGRAMME PATTERN	Semester			
9.	COURSE & SPECIALIZATION	Annexure-A- Bachelor of Computer Applications. Annexure-B : Optional (Honours) Specialization Area The students can opt for degree with honours programme in the second year subject to the fulfilment of the eligibility conditions. The 'Degree with Honours' Programme in the respective specializations will be offered subject to a minimum enrolment of students. Students may pursue optional (Honours) specialization in one of the specialization areas by completing additional 24 credits in Semester: 3, 4, 5, and 6 as specified in : 1. Data Science 2. Artificial Intelligence and Machine Learning 3. Cloud Computing 4. Data Security			

10.	FEE		Academic Fee p.a	Institute Deposit	Total
		Indian Students	165000	10000	175000
		International Students (USD equivalent to INR)	250000	10000	260000

Note: For additional optional specialization 'Honours', an additional fees of Rs. 35000/- will be charged from Second year onwards per year.

11.	ASSESSMENT	All internal courses will have 100% component as internal evaluation at the institute level. All external courses will have 40% internal component and 60% external component [University] examination.
12.	STANDARD OF PASSING	Bachelor of Computer Applications (Honours) in Data Science/Artificial Intelligence and Machine Learning/Cloud Computing/ Data Security will be awarded at the end of semester VI examination by taking into consideration the performance of all semester examinations after obtaining minimum 4.00 CGPA out of 10 CGPA.
13.	AWARD OF DEGREE/ DIPLOMA/ CERTIFICATE	Bachelor of Computer Applications (Honours) will be awarded.

14. NATURE WISE DISTRIBUTION OF CREDITS

Semester	Generic	Generic	Specialization	Specialization	Open Elective	Audit	Total
	Core	Elective	Core	Elective			
1	18	0	0	0	0	2*	18
2	20	0	0	0	0	1*	20
3	14	8	6	0	0	1*	22
4	18	10	6	0	0	0	28
5	8	8	6	0	0	0	16
6	0	16	6	0	0	0	16
Total	**78**	**42**	**24**	**0**	**0**	**0**	**144**

* Satisfactory completion of the non letter grade courses 'Integrated Disaster Management', 'Fitness for Life', 'Core Environmental Studies' and 'Certificate in COVID-19 Care for the Community' is mandatory for the award of degree.

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Annexure A

Catalog Course Code	Course Code	Course Title	Specialization	Credit	Internal Marks	External Marks	Total Marks
Semester : 1							
Generic Core Courses							
T3586	0301210101	Web Technologies		4	100	0	100
T3593	0301210102	Computational Thinking		4	40	60	100
T2495	0301210103	Business Communication		2	50	0	50
T3322	0301210104	Elements of Mathematics		2	20	30	50
T3244	0301210105	Introduction to Database Management System		2	20	30	50
T3213	0301210106	Introduction to Operating System		2	20	30	50
T3198	0301210107	Introduction to Python		2	20	30	50
T4005	0301210108	Integrated Disaster Management *		0	0	0	Non Letter Grade
TH4272	0301210109	Certificate in COVID-19 Care for the Community *		0	0	0	Non Letter Grade
Total				**18**	**270**	**180**	**450**
Semester : 2							
Generic Core Courses							
T3610	0301210201	Applications of Spreadsheets in Business		4	100	0	100
T3206	0301210202	Advanced Programming in Python		2	20	30	50
T3209	0301210203	Data Structures		2	20	30	50
T3200	0301210204	Linux Shell Scripting		2	20	30	50
T3224	0301210205	Network Essentials		2	20	30	50
T3205	0301210206	Web Development using CMS		2	50	0	50
T2981	0301210207	Introduction to Startup		2	50	0	50
T3605	0301210208	Elements of System and Software Development		2	20	30	50
T3609	0301210209	Structured Query Language		2	20	30	50
TH4095	0301210210	Fitness for Life *		0	0	0	Non Letter Grad
Total				**20**	**320**	**180**	**500**
Semester : 3							
Generic Core Courses							
T3202	0301210301	Object Oriented Programming		4	40	60	100
T3595	0301210302	Design and Implementation of Algorithms		4	40	60	100
T3606	0301210303	Software Engineering Practices		4	40	60	100
T3474	0301210304	Web Development using Python		2	20	30	50

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Catalog Course Code	Course Code	Course Title	Specialization	Credit	Internal Marks	External Marks	Total Marks
T2883	0301210305	Core Environmental Studies *		0	0	0	Non Letter Grade
			Total	**14**	**140**	**210**	**350**
		Generic Elective Courses Group					
T3221	0301210306	Introduction to Cloud Computing		4	40	60	100
T3237	0301210307	Foundations of Data Warehousing and Data Mining		4	40	60	100
T3663	0301210308	Introduction to Mobile Concepts		4	40	60	100
		Total Required Credits		**8**	**80**	**120**	**200**
		Semester : 4					
		Generic Core Courses					
T8000	0301210401	Service Learning		4	100	0	100
T3607	0301210402	Software Project Practices		4	40	60	100
T3258	0301210403	Current Trends and Practices in IT		3	75	0	75
T3803	0301210404	Project		3	75	0	75
T3371	0301210405	Introduction to Java Enterprise Framework		2	20	30	50
F0002	0301210406	Flexi-Credit Course		2	50	0	50
		Total		**18**	**360**	**90**	**450**
		Generic Elective Courses Group - I					
T3201	0301210407	Mobile Programming		4	40	60	100
TE7019	0301210408	Big Data Analytics		4	40	60	100
T3599	0301210409	Cloud Application Development		4	40	60	100
		Total Required Credits		**8**	**80**	**120**	**200**
		Generic Elective Courses Group - II					
T6096	0301210410	Creative Writing		2	50	0	50
T6181	0301210411	Understanding Cinema		2	50	0	50
T6182	0301210412	Appreciating Cinema		2	50	0	50
T6246	0301210413	Music in Media I		2	50	0	50
T6255	0301210414	Introduction to Theatre		2	50	0	50
T6274	0301210415	Foundations of Ethics		2	50	0	50
T6334	0301210416	Basic Sociology		2	50	0	50
T6307	0301210417	Basic Psychology		2	50	0	50
		Total Required Credits		**2**	**50**	**0**	**50**
		Semester : 5					
		Generic Core Courses					
T3608	0301210501	Software Testing		4	40	60	100

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Annexure A

Catalog Course Code	Course Code	Course Title	Specialization	Credit	Internal Marks	External Marks	Total Marks
T1234	0301210502	Information Technology and Regulatory Compliance		2	20	30	50
F0002	0301210503	Flexi-Credit Course		2	50	0	50
			Total	**8**	**110**	**90**	**200**
		Generic Elective Courses Group					
T3588	0301210504	Game Design		4	40	60	100
T3612	0301210505	Data Visualization		4	40	60	100
T3600	0301210506	Cloud Architectures and Security		4	40	60	100
		Total Required Credits		**8**	**80**	**120**	**200**
		Semester : 6					
		Choose Any One Group					
		Generic Elective Courses Group - I					
T3912	0301210601	Industry Internship		12	120	180	300
F0004	0301210602	Flexi-Credit Course		4	100	0	100
		Generic Elective Courses Group - II					
F0004	0301210603	Flexi-Credit Course		4	100	0	100
T3812	0301210604	Project		12	120	180	300
		Total Required Credits		**16**	**220**	**180**	**400**

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Annexure A

Semester	Internal Credits	External Credits	Total Credits	Total Marks
Semester 1	6	12	18	450
Semester 2	8	12	20	500
Semester 3	0	22	22	550
Semester 4	14	14	28	700
Semester 5	2	14	16	400
Semester 6	4	12	16	400
Total	**34**	**86**	**120**	**3000**

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Annexure B

Catalog Course Code	Course Code	Course Title	Specialization	Credit	Internal Marks	External Marks	Total Marks
			Semester : 3				
			Choose any one specialization				
			Honours Courses (Data Science)				
	TE7265	Introduction to Data Science	Data Science	3	30	45	75
	TE7538	Statistics for Data Science	Data Science	3	30	45	75
			Total Required Credits	6	60	90	150
			Honours Courses (Artificial Intelligence and Machine Learning)				
	T7473	Artificial Intelligence	Artificial Intelligence and Machine Learning	3	30	45	75
	T7529	Machine Learning	Artificial Intelligence and Machine Learning	3	30	45	75
			Total Required Credits	6	60	90	150
			Honours Courses (Cloud Computing)				
	TE7249	Cloud Computing Platforms	Cloud Computing	3	30	45	75
		Fog Computing	Cloud Computing	3	30	45	75
			Total Required Credits	6	60	90	150
			Honours Courses (Data Security)				
	T3222	Introduction to Vulnerability Assessment Penetration Testing	Data Security	4	40	60	100
	T3220	Information Security	Data Security	2	20	30	50
			Total Required Credits	6	60	90	150
			Semester : 4				
			Choose any one specialization on your choice of Semester-3 specialization				
			Honours Courses (Data Science)				
	T6850	Python for Data Science	Data Science	4	40	60	100
	T3647	Data Analytics using MS-Excel	Data Science	2	20	30	50
			Total Required Credits	6	60	90	150
			Honours Courses (Artificial Intelligence and Machine Learning)				
	TE7097	Neural Network	Artificial Intelligence and Machine Learning	3	30	45	75
	TE7103	Natural Language Processing	Artificial Intelligence and Machine Learning	3	30	45	75
			Total Required Credits	6	60	90	150

Catalog Course Code	Course Code	Course Title	Specialization	Credit	Internal Marks	External Marks	Total Marks
Honours Courses (Cloud Computing)						
		Cloud Programming and Application Development	Cloud Computing	3	30	45	75
		Cloud Administration	Cloud Computing	3	30	45	75
			Total Required Credits	6	60	90	150
Honours Courses (Data Security)						
	TE7296	Software Security	Data Security	3	30	45	75
	T3540	Identity and Access Management	Data Security	3	30	45	75
			Total Required Credits	6	60	90	150
Semester : 5						
Choose any one specialization on your choice of Semester-3 specialization						
Honours Courses (Data Science)						
	T3684	Advanced Big data Analytics	Data Science	3	30	45	75
		Web Performance Analysis	Data Science	3	30	45	75
			Total Required Credits	6	60	90	150
Honours Courses (Artificial Intelligence and Machine Learning)						
	TE7487	Deep Learning	Artificial Intelligence and Machine Learning	3	30	45	75
	T7573	Image Processing & Pattern Recognition	Artificial Intelligence and Machine Learning	3	30	45	75
			Total Required Credits	6	60	90	150
Honours Courses (Cloud Computing)						
	T3543	Virtualization and Security	Cloud Computing	3	30	45	75
	TE7250	Cloud Environment in Public Model	Cloud Computing	3	30	45	75
			Total Required Credits	6	60	90	150
Honours Courses (Data Security)						
	TE7457	Cyber Security	Data Security	3	30	45	75
	T3022	Cryptography	Data Security	3	30	45	75
			Total Required Credits	6	60	90	150
Semester : 6						
Choose any one specialization on your choice of Semester-3 specialization						
Honours Courses (Data Science)						
	T3636	Quantum Machine Learning	Data Science	3	30	45	75
	T3364	Data Management	Data Science	3	30	45	75
			Total Required Credits	6	60	90	150
Honours Courses (Artificial Intelligence and Machine Learning)						
	TE7497	Responsible AI	Artificial Intelligence and Machine Learning	3	30	45	75
		AI applications in social media	Artificial Intelligence and Machine Learning	3	30	45	75
			Total Required Credits	6	60	90	150
Honours Courses (Cloud Computing)						
		Cloud and AI	Cloud Computing	3	30	45	75
	T3412	Cloud Security	Cloud Computing	2	20	30	50
			Total Required Credits	6	60	90	150

Catalog Course Code	Course Code	Course Title	Specialization	Credit	Internal Marks	External Marks	Total Marks
			Honours Courses (Data Security)				
	T3690	Computer Forensics - Detection and Prevention of IT Frauds	Data Security	4	40	60	100
	T3381	Information System Security Audit	Data Security	2	20	30	50
			Total Required Credits	6	60	90	150

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Optional Honours Specialization
Credits and Marks Summary

Semester	Internal Credits	External Credits	Total Credits	Total Marks
Honours Courses (Data Science)				
Semester 3	0	6	6	150
Semester 4	0	6	6	150
Semester 5	0	6	6	150
Semester 6	0	6	6	150
Total	**0**	**24**	**24**	**600**
Honours Courses (Artificial Intelligence and Machine Learning)				
Semester 3	0	6	6	150
Semester 4	0	6	6	150
Semester 5	0	6	6	150
Semester 6	0	6	6	150
Total	**0**	**24**	**24**	**600**
Honours Courses (Cloud Computing)				
Semester 3	0	6	6	150
Semester 4	0	6	6	150
Semester 5	0	6	6	150
Semester 6	0	6	6	150
Total	**0**	**24**	**24**	**600**
Honours Courses (Data Security)				
Semester 3	0	6	6	150
Semester 4	0	6	6	150
Semester 5	0	6	6	150
Semester 6	0	6	6	150
Total	**0**	**24**	**24**	**600**