



SYMBIOSIS INTERNATIONAL (DEEMED UNIVERSITY)

(Established under section 3 of the UGC Act, 1956)

Re-accredited by NAAC with 'A++' Grade | Awarded Category - I by UGC

Founder: Prof. Dr. S. B. Mujumdar, M. Sc., Ph. D. (Awarded Padma Bhushan and Padma Shri by President of India)

SIU/ACAD/2024/2924

Date: 09/07/2024

To
The Director
Symbiosis Institute of Computer Studies and Research,
Pune

**Subject: Approval of Programme Structure of Bachelor of Computer Applications -
Honours/Honours with Research, batch 2024-28**

Dear Sir,

This is to inform you that the following Programme Structure has been duly approved by the Academic Council for the Academic Year 2024-2025.

Sr. No.	Programme	Batch
1	Bachelor of Computer Applications - Honours/Honours with Research	2024-28

Thanking you.

Sincerely,

Dr. Asmita Dani
Director- Academics

Copy to: Controller of Examinations, SIU
The Director Admission, SIU

Symbiosis Institute of Computer Studies and Research, Pune
Bachelor of Computer Applications Honours/Honours with Research
Programme Structure 2024-28

1.	OBJECTIVE	<p>BCA (Honours/Honours with Research) 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.</p> <p>BCA (Honours/Honours with Research) 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.</p>				
2.	DURATION (IN MONTHS)	48 (Full Time) With Multiple Entry and Multiple Exit Options				
3.	INTAKE	180				
4.	RESERVATION	I. Within the sanctioned intake II. Over and above the sanctioned intake	a) SC (In Percentage) 15	b) ST (In Percentage) 7.5	c) Differently abled (In Percentage) 3	d) Defence (In Percentage) 5
			a) Kashmiri Migrants (In Seats) 2	b) International Students (In Percentage) 20		
5.	ELIGIBILITY	<p>Passed Standard XII (10+2) or equivalent government approved Diploma in Engineering/ Technology from any recognised Board with a minimum of 50% marks or equivalent grade (45% marks or equivalent grade for Scheduled Caste/ Scheduled Tribes).</p> <p>Students who wish to opt for Honours with Research must earn 7.5 CGPA and above at the end of Semester-6</p> <p>Eligibility Criteria for the Multiple entries would be as per University's Lateral Entry Rules for FYUG Programmes</p>				

6.	SELECTION PROCEDURE	Symbiosis Entrance Test, Personal Interaction and Writing Ability Test (PI-WAT). Selection Procedure for the Multiple Entry would be as per the University's Lateral Entry Rules for FYUG Programmes				
7.	MEDIUM OF INSTRUCTION	English				
8.	PROGRAMME PATTERN	Semester				
9.	COURSE & SPECIALIZATION	As per Annexure A List of Majors Offered (Choose any one) 1. Data Science 2. Artificial Intelligence and Machine Learning 3. Cloud Computing 4. Data Security List of Minors Offered (Choose any one) 1. Software Development 2. System Administration 3. Database Administration				
10.	FEE			Academic Fee p. a	Institute Deposit	Total
		Indian Students (Amount in INR)		2,13,000/-	20,000/-	2,33,000/-
		International Students	NRI/ PIO/ OCI Category (Amount in US\$)	4,070	275	4,345
			Foreign National Category (Amount in US\$)	1,300	275	1,575
Note- The exiting students will have to complete the additional 4 credit vocational course for the award of a Certificate/ Diploma by paying additional fees at the time of intimation of the exit. The additional fees of 4 credit vocational course will be informed in due course of time.						
11.	ASSESSMENT	The courses will have 60% Continuous Assessment and 40% Term End [University] examination however, some courses (not more than 30% of the total programme credits) may have 100% Continuous Assessment.				

12.	STANDARD OF PASSING	The assessment of students for each examination is done, based on relative performance. Maximum Grade Point (GP) is 10 corresponding to O (Outstanding). For all courses, a student is required to pass both internal and external examination separately with a minimum Grade Point of 4 corresponding to Grade P. Students securing less than 40% absolute marks in each head of passing will be declared FAIL. The University awards a degree to the student who has achieved a minimum CGPA of 4.00 out of maximum of 10 CGPA for the programme.
13.	AWARD OF DEGREE/ DIPLOMA/ CERTIFICATE	<p>Certificate in Computer Applications will be awarded at the end of the semester 2 by taking into consideration the performance of all semester examinations after obtaining minimum 4.00 CGPA out of 10 CGPA and the successful completion of the 4 credit Vocational Course in the summer.</p> <p>Diploma in Computer Applications will be awarded at the end of the semester 4 by taking into consideration the performance of all semester examinations after obtaining minimum 4.00 CGPA out of 10 CGPA and the successful completion of the 4 credit Vocational Course in the summer.</p> <p>Bachelor of Computer Applications with the applicable major and applicable minor will be awarded at the end of the semester 6 examination by taking into consideration the performance of all semester examinations after obtaining minimum 4.00 CGPA out of 10 CGPA.</p> <p>Bachelor of Computer Applications Honours with the applicable major and applicable minor will be awarded at the end of the semester 8 examination by taking into consideration the performance of all semester examinations after obtaining minimum 4.00 CGPA out of 10 CGPA</p> <p>Bachelor of Computer Applications Honours with Research with the applicable major and applicable minor will be awarded at the end of the semester 8 examination by taking into consideration the performance of all semester examinations after obtaining minimum 4.00 CGPA out of 10 CGPA.</p>

14.	CLASSIFICATION OF CREDITS AND NUMBER OF NON-CREDIT COURSES										
Semester	Major	Minor	Multi-disciplinary	Ability Enhancement	Skill Enhancement	Common Value Added	Summer Internship	Research Project / Dissertation	Total Credits	No. of Mandatory Non-Credit Course/s	No. of Non-Credit Audit Course/s
1	8	4	0	3	3	3	0	0	21	1	As per the Student's Choice
2	4	4	3	2	4	3	0	0	20	1	
3	10	2	3	3	2	0	0	0	20	1	
4	10	8	3	0	0	0	0	0	21	1	
5	16	4	0	0	0	0	0	0	20	1	
6	14	2	0	0	0	0	4	0	20	0	
Total	62	24	9	8	9	6	4	0	122		
Honours											
7	12	4	0	0	0	0	0	4	20	0	
8	12	6	0	0	0	0	0	4	22	0	
Total	86	34	9	8	9	6	4	8	164		
Honours with Research											
7	16	4	0	0	0	0	0	0	20	0	
8	4	4	0	0	0	0	0	12	20	0	
Total	82	32	9	8	9	6	4	12	162		
1. The students exiting the Programme after Semester – 2 OR Semester – 4 should complete vocational courses of total 4 credits in the summer to obtain the Certificate/Diploma.											
2. Passing Mandatory Non-Credit Courses is a requirement for the award of the degree.											

This Programme Structure is aligned with the norms laid down by the University and is approved by the Academic Council.

Hereafter changes (if any) which conform to the policy on "Curriculum Development and Review" would be permissible, subject to revision of the Programme Structure, following the specified processes.

[Signature]
Director - Academics

Symbiosis Institute of Computer Studies and Research, Pune
Bachelor of Computer Applications (Honours/Honours with Research)
Programme Structure 2024-28

Annexure A

Catalogue Course Code	Course Code	Course Title	Major / Minor	Credits	Continuous Assessment Marks	Term End Examination Marks	Total Marks
Semester – 1							
Major Course							
T3586	0301240101	Web Technologies		4	100	0	100
T2713	0301240102	Innovation Management and New Product Development		4	60	40	100
Minor Course							
T3593	0301240103	Computational Thinking		4	60	40	100
Ability Enhancement Course							
T6547	0301240104	Communication Skills		3	75	0	75
Skill Enhancement Courses							
TE7556	0301240105	Introduction to Python Programming		3	45	30	75
Common Value-Added Course							
TH4521	0301240106	Yoga and Mental Health		3	75	0	75
Mandatory Non-Credit Course							
T4005	0301240107	Integrated Disaster Management		0	0	0	0
Grand Total				21	415	110	525

Catalogue Course Code	Course Code	Course Title	Major / Minor	Credits	Continuous Assessment Marks	Term End Examination Marks	Total Marks
Semester – 2							
Major Course							
T3239	0301240201	Relational Database Management System		4	60	40	100
Minor Course							
T7549	0301240202	Data Structures and Algorithms		4	60	40	100
Ability Enhancement Course							
T6483	0301240203	Creative Writing		2	50	0	50
Skill Enhancement Course							
T3204	0301240204	Server-Side Web Technology		4	60	40	100
Common Value-Added Courses							
T4780	0301240205	Yoga Therapy Principles and Practices		3	75	0	75
Mandatory Non-Credit Course							
TH4095	0301240206	Fitness for Life		0	0	0	0
Multidisciplinary Courses							
(Choose Any One Course from the University Basket of Multidisciplinary Courses given in Annexure B)							
-	-	MD1		3	75	0	75
Grand Total				20	380	120	500
Vocational Courses (Summer)							
(Only for students who wish to exit after the First Year with a Certificate)							
T3610	0301240207	Applications of Spreadsheets in Business		4	100	0	100
Total Required Credits				4	100	0	100
Note: Students exiting at the end of the second semester and earning 41 credits will be awarded a "Certificate in Computer Applications" provided they successfully complete the additional 4 credits of vocational course offered							

Catalogue Course Code	Course Code	Course Title	Major / Minor	Credits	Continuous Assessment Marks	Term End Examination Marks	Total Marks
during the summer term.							
Semester – 3							
Major Courses							
T7998	0301240301	Operating Systems		4	60	40	100
T3609	0301240302	Structured Query Language		2	30	20	50
T3224	0301240303	Network Essentials		2	30	20	50
T3394	0301240304	Internet of Things		2	30	20	50
Minor Course							
T3740	0301240305	Software Engineering		2	30	20	50
Ability Enhancement Courses							
T6754	0301240306	Business and Managerial Communication		3	75	0	75
Skill Enhancement Course							
T3577	0301240307	Data Analysis Using Python		2	30	20	50
Mandatory Non-Credit Course							
SMC002	0301240308	Core Environmental Studies		0	0	0	0
Multidisciplinary Courses (Choose Any One Course from the University Basket of Multidisciplinary Courses given in Annexure B)							
-	-	MD2		3	75	0	75
Grand Total				20	360	140	500

Catalogue Course Code	Course Code	Course Title	Major / Minor	Credits	Continuous Assessment Marks	Term End Examination Marks	Total Marks
Semester - 4							
Major Courses							
T3221	0301240401	Introduction to Cloud Computing		4	60	40	100
T3237	0301240402	Foundations of Data Warehousing and Data Mining		4	60	40	100
T8000	0301240403	Service Learning		2	50	0	50
Minor Courses							
T7999	0301240404	Java Programming		4	60	40	100
T3487	0301240405	Network Security Essentials		4	60	40	100
Mandatory Non-Credit Course							
SMC001	0301240406	Vasudhaiva Kutumbakam		0	0	0	0
Multidisciplinary Courses							
(Choose Any One Course from the University Basket of Multidisciplinary Courses given in Annexure B)							
-	-	MD3		3	75	0	75
Grand Total				21	365	160	525
Vocational Courses (Summer)							
(Only for students who wish to exit after the Second Year with a Diploma)							
T3610	0301240407	Applications of Spreadsheets in Business		4	100	0	100
Total Required Credits				4	100	0	100
Note: Students exiting at the end of the fourth semester and earning 82 credits will be awarded a "Diploma in Computer Applications," provided they successfully complete the additional 4 credits of vocational courses offered during the summer term.							

Catalogue Course Code	Course Code	Course Title	Major / Minor	Credits	Continuous Assessment Marks	Term End Examination Marks	Total Marks
Semester - 5							
Major Courses							
T2208	0301240501	Research Methodology		4	60	40	100
T3009	0301240502	Best Programming Practices		2	30	20	50
T2645	0301240503	Lean Startup		2	30	20	50
Major Courses (Choose Any One Group)							
Group 1 - Data Science							
T6967	0301240504	Data Science I	Data Science	4	60	40	100
T3604	0301240505	Essentials of Business Intelligence	Data Science	4	60	40	100
Group 2 - Artificial Intelligence and Machine Learning							
TE7453	0301240506	Introduction to Artificial Intelligence	Artificial Intelligence and Machine Learning	4	60	40	100
TE7023	0301240507	Machine Learning	Artificial Intelligence and Machine Learning	4	60	40	100
Group 3 - Cloud Computing							
T3674	0301240508	Cloud Applications for Business Processes	Cloud Computing	4	60	40	100
T3600	0301240509	Cloud Architectures and Security	Cloud Computing	4	60	40	100
Group 4 - Data Security							

Catalogue Course Code	Course Code	Course Title	Major / Minor	Credits	Continuous Assessment Marks	Term End Examination Marks	Total Marks
T3222	0301240510	Introduction to Vulnerability Assessment Penetration Testing	Data Security	4	60	40	100
F0004	0301240511	Flexi-credit Course	Data Security	4	100	0	100
Total Required Credits				8	120/160	80/40	200
Minor Courses (Choose Any One Group)							
Group 1 – Software Development							
T3201	0301240512	Mobile Programming	Software Development	4	60	40	100
Group 2 - System Administration							
T3601	0301240513	Network Administration	System Administration	4	60	40	100
Group 3 - Database Administration							
T7522	0301240514	Advanced Databases	Database Administration	4	60	40	100
Total Required Credits				4	60	40	100
Mandatory Non-Credit Course							
TH4535	0301240515	Emotional Well-being		0	0	0	0
Grand Total				20	300/340	200/160	500
Semester – 6							
Major Courses							
T3264	0301240601	Basic of Java Enterprise Technology		4	60	40	100
T3603	0301240602	Block Chain		2	30	20	50
Major Courses (Choose Any One Group)							
Group 1 – Data Science							

Catalogue Course Code	Course Code	Course Title	Major / Minor	Credits	Continuous Assessment Marks	Term End Examination Marks	Total Marks
T3510	0301240603	Big Data: Storage and Analytics	Data Science	4	60	40	100
TE7281	0301240604	Open Source Tools for Data Science	Data Science	4	60	40	100
Group 2 – Artificial Intelligence and Machine Learning							
TE7022	0301240605	Predictive Analytics	Artificial Intelligence and Machine Learning	4	60	40	100
TE7912	0301240606	Supervised Machine Learning and Advances	Artificial Intelligence and Machine Learning	4	60	40	100
Group 3 – Cloud Computing							
T3752	0301240607	Fog Computing and edge computing	Cloud Computing	4	60	40	100
T3750	0301240608	Cloud administration and Management	Cloud Computing	4	60	40	100
Group 4 – Data Security							
T3748	0301240609	Data Privacy and identity Access Control	Data Security	4	60	40	100
TE7252	0301240610	Cryptography	Data Security	4	60	40	100
Total Required Credits				8	120	80	200
Minor Courses (Choose Any One Group)							
Group 1 – Software Development							
T3691	0301240611	Introduction to web services	Software Development	2	30	20	50
Group 2 – System Administration							
T3175	0301240612	Network Design	System Administration	2	30	20	50
Group 3 – Database Administration							

Catalogue Course Code	Course Code	Course Title	Major / Minor	Credits	Continuous Assessment Marks	Term End Examination Marks	Total Marks
T3529	0301240613	NoSQL Databases	Database Administration	2	30	20	50
Total Required Credits				2	30	20	50
Summer Internship							
T3904	0301240614	Summer Internship		4	60	40	100
Grand Total				20	300	200	500
Note: Students exiting at the end of the sixth semester and earning 122 credits will be awarded a "Bachelor of Computer Applications" degree. Total Credits at the end of the Third year (Major 62, Minor 24, Multidisciplinary 9, Ability Enhancement Courses 8, Skill Enhancement Courses 9, Summer Internship 4, Common Value-Added Courses 6).							
Semester – 7 (Honours)							
Major Courses							
T3536	0301240701	Web UI and Content Management		4	60	40	100
T5514	0301240702	Design Thinking and Problem Solving		2	30	20	50
Major Courses (Choose Any One Group)							
Group 1 – Data Science							
T6850	0301240703	Python for Data Science	Data Science	4	60	40	100
T3647	0301240704	Data Analytics using MS-Excel	Data Science	2	30	20	50
Group 2 – Artificial Intelligence and Machine Learning							
TEE7022	0301240705	Natural Language and Responsive AI	Artificial Intelligence and Machine Learning	4	60	40	100
T3736	0301240706	Deep learning	Artificial Intelligence and Machine Learning	2	30	20	50
Group 3 – Cloud Computing							

Catalogue Course Code	Course Code	Course Title	Major / Minor	Credits	Continuous Assessment Marks	Term End Examination Marks	Total Marks
T3753	0301240707	Grid Computing and Utility computing	Cloud Computing	4	60	40	100
T2894	0301240708	Cloud-based Solution Architecture	Cloud Computing	2	30	20	50
Group 4 – Data Security							
TE7458	0301240709	Advanced Cyber Security	Data Security	4	60	40	100
T3044	0301240710	Security Management Practices	Data Security	2	30	20	50
Total Required Credits				6	90	60	150
Minor Courses (Choose Any One Group)							
Group 1 – Software Development							
T3374	0301240711	Advance Android Programming	Software Development	4	60	40	100
Group 2 – System Administration							
T3602	0301240712	Network Monitoring and Troubleshooting	System Administration	4	60	40	100
Group 3 – Database Administration							
T3749	0301240713	Database Security and Performance Tuning	Database Administration	4	60	40	100
Total Required Credits				4	60	40	100
Dissertation							
T3704	0301240714	Dissertation		4	100	0	100
Grand Total				20	340	160	500
Semester – 7 (Honours with Research)							
Major Courses							
THM6020	0301240715	Literature Review		4	60	40	100
THM6022	0301240716	Scientific Paper Writing		4	60	40	100

Catalogue Course Code	Course Code	Course Title	Major / Minor	Credits	Continuous Assessment Marks	Term End Examination Marks	Total Marks
THM6021	0301240717	Ethics in Research		4	60	40	100
T3744	0301240718	R Programming		4	60	40	100
Minor Course							
T3804	0301240719	Project		4	100	0	100
Grand Total				20	340	160	500
Semester – 8 (Honours)							
Major Course							
T3242	0301240801	Software Quality Management and Standards		4	60	40	100
T3739	0301240802	Agile Methodologies		2	30	20	50
Major Courses (Choose Any One Group)							
Group 1- Data Science							
T6987	0301240803	Statistical Machine Learning	Data Science	4	60	40	100
T6988	0301240804	Text Mining	Data Science	2	30	20	50
Group 2 - Artificial Intelligence and Machine Learning							
T3612	0301240805	Data Visualisation	Artificial Intelligence and Machine Learning	4	60	40	100
F0002	0301240806	Flexi-credit Course	Artificial Intelligence and Machine Learning	2	50	0	50
Group 3 - Cloud Computing							
T3751	0301240807	Cloud data Centre management	Cloud Computing	4	60	40	100

Catalogue Course Code	Course Code	Course Title	Major / Minor	Credits	Continuous Assessment Marks	Term End Examination Marks	Total Marks
T3026	0301240808	High Performance Computing	Cloud Computing	2	30	20	50
Group 4 - Data Security							
T3053	0301240809	Server Security and Hardening	Data Security	4	60	40	100
T3036	0301240810	Information Risk Management	Data Security	2	30	20	50
Total Required Credits				6	90/110	60/40	150
Minor Course							
T3344	0301240811	DevOps		2	30	20	50
Minor Courses (Choose Any One Group)							
Group 1 - Software Development							
T3469	0301240812	Advance Web Scripting	Software Development	4	60	40	100
Group 2 - System Administration							
T3690	0301240813	Computer Forensics - Detection and Prevention of IT Frauds	System Administration	4	60	40	100
Group 3 - Database Administration							
T3396	0301240814	Database Technologies	Database Administration	4	60	40	100
Total Required Credits				4	60	40	100
Project							
T3804	0301240815	Project		4	100	0	100
Grand Total				22	370/390	180/160	550
Semester: 8 (Honours with Research)							
Major Course							

Catalogue Course Code	Course Code	Course Title	Major / Minor	Credits	Continuous Assessment Marks	Term End Examination Marks	Total Marks
T1743	0301240816	Intellectual Property Rights		4	60	40	100
Minor Course							
F0004	0301240817	Flexi-credit Course		4	100	0	100
Research Project							
T3812	0301240818	Research Project		12	180	120	300
Grand Total				20	340	160	500
Note: Total Credits at the end of Fourth year Bachelor of Computer Applications-Honours - 164 (Major 86, Minor 34, Multidisciplinary 9, Ability Enhancement Courses 8, Skill Enhancement Courses 9, Summer Internship 4, Research Project 8, Common Value-Added Courses 6). Total Credits at the end of Fourth year for Bachelor of Computer Applications-Honours with Research – 162 (Major 82, Minor 32, Multidisciplinary 9, Ability Enhancement Courses 8, Skill Enhancement Courses 9, Summer Internship 4, Dissertation 12, Common Value-Added Courses 6).							



Symbiosis Institute of Computer Studies and Research, Pune
Bachelor of Computer Applications - Honours/Honours with Research
Programme Structure 2024-28

SUMMARY

Semester	100% Continuous Assessment Credits	Term End (University) Examination Credits	Total Credits	Total Marks
1	10	11	21	525
2	8	12	20	500
3	6	14	20	500
4	5	16	21	525
5	0/4	20/16	20	500
6	0	20	20	500
Total	29/33	93/89	122	3050
Honours				
7	4	16	20	500
8	4/6	18/16	22	550
Total	37/39	127/125	164	4100
Honours with Research				
7	4	16	20	500
8	4/6	16/14	20	500
Total	37/41	125/121	162	4050

Symbiosis Institute of Computer Studies and Research, Pune
Bachelor of Computer Applications Honours/Honours with Research
Programme Structure 2024-28

Annexure B (List of Multidisciplinary Courses)

S. No.	Catalogue Course Code	Course Code			Course Title	Credit
		Semester 2	Semester 3	Semester 4		
1	T1454	0301240208	0301240309	0301240408	Constitutional Law I	3
2	T2119	0301240209	0301240310	0301240409	Consumer Behaviour and Insights	3
3	TH4542	0301240210	0301240311	0301240410	Dancercise	3
4	TH4541	0301240211	0301240312	0301240411	Data Analytics in Sports	3
5	T5787	0301240212	0301240313	0301240412	Digital Design Tools - Visual Media	3
6	TH4539	0301240213	0301240314	0301240413	Fitness and Sports	3
7	T2467	0301240214	0301240315	0301240414	Fundamentals of Brand Management	3
8	THM6023	0301240215	0301240316	0301240415	Games of Uncertainty	3
9	T4729	0301240216	0301240317	0301240416	Intellectual Property Rights	3
10	T1471	0301240217	0301240318	0301240417	Law of Contracts	3
11	T5953	0301240218	0301240319	0301240418	Public Relations and Corporate Communication	3
12	T2489	0301240219	0301240320	0301240419	Renewable Energy Sources	3
13	TH4540	0301240220	0301240321	0301240420	Self-Defence	3
14	TE7223	0301240221	0301240322	0301240421	Smart Urban Planning	3
15	T2701	0301240222	0301240323	0301240422	Social Entrepreneurship	3
16	THM6037	0301240223	0301240324	0301240423	Statistics of Nature	3
17	TH4538	0301240224	0301240325	0301240424	Weight Training and Conditioning	3
18	TH4537	0301240225	0301240326	0301240425	Well for Life	3
19	TH4536	0301240226	0301240327	0301240426	Yoga and Stress Management	3
20	TH4363	0301240227	0301240328	0301240427	Cognitive Psychology	3
21	T6767	0301240228	0301240329	0301240428	Public Policy in India	3
22	T6769	0301240229	0301240330	0301240429	India's Foreign Policy	3
23	TE7689	0301240230	0301240331	0301240430	Statistics and Probability	3