INFORMATION TECHNOLOGY and COMPUTER SCIENCE (CS)

Curriculum Guide for Academic Year 2012-2013

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Students planning to **transfer** to a four-year college or university should refer to the ASSIST web site at www.assist.org and **consult a counselor** before beginning a program of study. Please call 562-938-4561 for the LAC, or (562) 938-3920 for PCC to schedule a meeting with a counselor. Students may also wish to visit the Transfer Center on either campus.

Program of study leading to:
Associate in Arts (A.A.) Degree

Track 1: Microcomputer Help-Desk Technician: **1123** *This track is intended for students interested in working as a help desk technician or in technical support of the PC systems.*

	Required CORE courses (listed below in recommended sequence)		UNITS	In Progress	Completed Grade
†	COSA 50	Business Information Systems	4		
	BCOM 15 **OR**	Business Communications **OR**	3		
	BCOM 20	Business Writing	3		
	COSN 10	Networking Fundamentals	3		
†	COSP 36	Systems Analysis and Design	4		
		Subtotal Units	**14**		

	Required MAJOR COURSES (listed below in recommended sequence)		UNITS	In Progress	Completed Grade
	COSS 270	Information Security Fundamentals	1		
†	COSN 3	Operating Systems: Software & Hardware	4		
†	COSN 5	Computer Technician Hardware Basics	4		
†	BCOM 270	Help Desk Concepts	2		
		Subtotal Units	**11**		

Associate Degree requirements continue on the following page:

INFORMATION TECHNOLOGY/COMPUTER SCIENCE 2012-2013
Track 1 AA = 1123; C-ACH = 3123   Track 2 AA = 1124; C-ACH = 3124
Track 3 AA = 1119; C-ACH = 3119   Track 4 AA = 1125; C-ACH = 3125
Departmental Phone: 562-938-4904, Web site: http://www.lbcc.edu/cos , Email: cbis@lbcc.edu
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Associate Degree requirements continued from the previous page:

Track 1 continued:

Complete THREE (3) UNITS from the following courses:

			UNITS		
†	COSA 10AD	Microsoft Word for Windows	4		
†	COSW 10AD	Web Design	4		
†	COSN 205	Unix/Linux Fundamentals	4		
	BCOM 263	Customer Service	3		
†	COSA 40	Microsoft Office – Advanced	4		
		Subtotal Units	**3**		
		TRACK 1 TOTAL UNITS	**28**		

Track 2: Programmer: 1124 *.This track is intended for students interested in becoming a computer programmer.*

Required CORE courses (listed below in recommended sequence)

			UNITS	In Progress	Completed Grade
†	COSA 50	Business Information Systems	4		
	BCOM 15 **OR**	Business Communications **OR**	3		
	BCOM 20	Business Writing	3		
	COSN 10	Networking Fundamentals	3		
†	COSP 36	Systems Analysis and Design	4		
		Subtotal Units	**14**		

REQUIRED MAJOR COURSES (listed below in recommended sequence)

			UNITS	In Progress	Completed Grade
†	COSN 3	Operating Systems: Software and Hardware	4		
†	COSP 7	Business Programming Logic & Design	4		
†	COSP 38	Database Concepts	4		
		Subtotal Units	**12**		

IN ADDITION, complete ONE (1) of the following SERIES:

			UNITS		
††	COSP 8 **AND**	Visual BASIC Programming **AND**	4 **AND**		
	COSP 208	Advanced Visual Basic Programming	4		
	OR				
††	CS 11 **AND**	Computer Programming/C++ I **AND**	4 **AND**		
	CS 12	Computer Programming/C++ II	4		
	OR				
†	CS 21A **AND**	Java: Computer Science 1 **AND**	4 **AND**		
†	CS 21B	Java: Computer Science 2	4		
		Subtotal Units	**8**		

Recommended but not required Electives:

			UNITS		
†	COSP 8	Visual BASIC Programming	4		
†	CS 11	Computer Programming/C++ I	4		
†	CS 21A	Introduction to Computer Science I	4		
†	COSP 216	Introduction to C# Programming	4		
†	COSN 205	Unix/Linux Fundamentals	4		
†	COSA 210	Intro to Project Management Systems (SP)	3		
†	COSS 271	Network Security Fundamentals	3		
†	COSW 251	Introduction to ASP.NET	4		
†	COSW 20	Dynamic HTML Web Construction	4		
†	COSW 220	PHP & My SQL for the Web	3.5		
†	COSW 230	Ruby on Rails Web Development	3.0		
		Subtotal Units			
		TRACK 2 TOTAL UNITS:	**34**		

Track 3: Programmer—Computer Science: 1119 .This track is intended for students interested in Computer Science courses that will help them succeed after transferring to a CSU or UC School Computer Science major program. See a counselor to inquire about CSU or UC school-specific computer science transfer requirements. Not all the courses in this track will meet the specific degree requirements for a particular school.

Required CORE courses (listed below in recommended sequence)		UNITS	In Progress	Completed Grade
† COSA 50	Business Information Systems	4		
BCOM 15 **OR**	Business Communications **OR**	3		
BCOM 20	Business Writing	3		
COSN 10	Networking Fundamentals	3		
† COSP 36	Systems Analysis and Design	4		
	Subtotal Units	14		

REQUIRED MAJOR COURSES (listed below in recommended sequence)		UNITS	In Progress	Completed Grade
† COSP 7	Business Programming Logic & Design	4		
† CS 22	Data Structures and Algorithms	4		
† MATH 60	First Calculus Course	5		
	Subtotal Units	13		

IN ADDITION, complete ONE (1) of the following SERIES:		UNITS		
†† CS 11 **AND**	Computer Programming/C++ I **AND**	4 **AND**		
CS 12	Computer Programming/C++ II	4		
OR				
†† CS 21A **AND**	Java: Computer Science 1 **AND**	4 **AND**		
CS 21B **AND**	Java: Computer Science 2	4		
	Subtotal Units	8		

Recommended But Not Required Electives:		UNITS		
† COSP 8	Visual BASIC Programming	4		
† CS 11	Computer Programming/C++ I	4		
† CS 21A	Java: Computer Science 1	4		
† COSP 216	Introduction to C# Programming	4		
† COSW 220	PHP & My SQL for the Web	3		
† COSW 230	Ruby on Rails Web Development	3		
† MATH 60	First Calculus Course	5		
† MATH 70	Second Calculus Course	5		
† MATH 80	Third Calculus Course	5		
† MATH 55	Discrete Mathematics	4		
† PHYS 3A	Physics in Science and Engineering-Mechanics	5		
† PHYS 3B	Physics in Science and Engineering-E and M	4.5		
† PHYS 3C	Physics in Science and Engineering-Modern Physics	4.5		
	Subtotal Units			
	TRACK 3 TOTAL UNITS:	35		

Track 4: Networking: 1125 *This track is intended for students interested in working as a help desk technician or in technical support of the PC systems.*

Required CORE courses (listed below in recommended sequence)		UNITS	In Progress	Completed Grade
† COSA 50	Business Information Systems	4		
BCOM 15 **OR**	Business Communications **OR**	3		
BCOM 20	Business Writing	3		
COSN 10	Networking Fundamentals	3		
† COSP 36	Systems Analysis and Design	4		
	Subtotal Units	**14**		

REQUIRED COURSES (listed below in recommended sequence)		UNITS	In Progress	Completed Grade
† COSN 5	Computer Technician Hardware Basics	4		
† COSN 200	Wireless Communications	2		
† COSN 205	Unix/Linux Fundamentals	4		
† COSN 225	Microsoft Windows Server O.S.	2.5		
† COSN 230	Microsoft Windows Networking	2.5		
† COSN 235	Microsoft Windows Directory Services	2.5		
† COSS 271	Network Security Fundamentals	3		
	Subtotal Units	**20.5**		

Recommended but not required Electives:		UNITS		
† COSN 240	Microsoft Windows Client O.S.	2.5		
COSS 270	Information Security Fundamentals	1		
CISCO 250	Networking Wiring Installation	3		
CISCO 251	Introduction to Networking	3		
CISCO 253	Cisco Networking III, LAN	3		
CISCO 254	WAN's and Remote Access	3		
COSN 3	Operating Systems: Software and Hardware	4		
COSN 210AD	Linux Server Administration	4		
COSN 215AD	Linux Networking & Security	4		
	TRACK 4 TOTAL UNITS	**34.5**		

For graduation with an **Associate in Arts (A.A.) Degree with a major in CBIS/CS:**

1. **Minimum Unit Requirements:** Any course that appears on a curriculum guide and the General Education Pattern (Plan A) may fulfill both major and general education requirements (Approved by College Curriculum Committee Spring 2012). For this degree, complete a minimum of 60 units in courses numbered 1-599. Please note that additional elective units may be required to meet this minimum based upon courses selected to fulfill General Education for the Associate Degree.

2.

Track 1: Microcomputer Help-Desk Tech	**Major**:	28 units
	General Education/A.A.	25 units
	Minimum Total Units:	60 units

Track 2: Programmer	**Major:**	34 units
	General Education/A.A.	25 units
	Minimum Total Units	60 units

Track 3: **Programmer-Computer Science**	**Major:**	35 units
	General Education/A.A.	25 units
	Minimum Total Units:	60 units
Track 4: **Networking**	**Major:**	34.5 units
	General Education/A.A.	25 units
	Minimum Total Units:	60 units

1. **Scholarship:** Maintain an **overall grade point average (GPA) of 2.0** ("C" average) based on all accredited college work applied to the degree, no matter where completed. For this **field of concentration, complete each course above** with a **grade of "C" or better**, or "P" if course is graded on a P/NP basis.
2. **Residence for the Degree:** Complete at least 30 units of the required 60 in residence at LBCC, or complete in residence at LBCC at least 20 units within the last 30 units of work applied to the degree.
3. **Residence for the Field of Concentration**: Complete fifty percent (50%) or more of the unit requirements for this field of concentration in residence; this means:
   > For **Track 1**, complete **at least 14 units** of the required 28 **at Long Beach City College**.
   > For **Track 2**, complete **at least 17 units** of the required 34 **at Long Beach City College**.
   > For **Track 3**, complete **at least 18 units** of the required 35 **at Long Beach City College**.
   > For **Track 4**, complete **at least 18 units** of the required 34.5 **at Long Beach City College**.
   Credit earned by exam, where applicable, may be included.
4. **General Education and Proficiency Requirements:** Complete the required A.A./A.S. General Education and Proficiency requirements*, otherwise known as "Plan A". For Plan A requirements, refer to the general catalog or view it online at http://osca.lbcc.edu .
5. Complete and submit the degree application form to the Admissions and Records office during your final semester of course work. These forms are available in the Admissions and Records office, or online at http://admissions.lbcc.edu/ . Refer to the Schedule of Classes (http://schedule.lbcc.edu) and click the "Important Dates" link to view the actual deadline for each semester.

*The requirements for general education/proficiency and the field of concentration (major) need to be from the same catalog year. This catalog year may be any year between the year of initial enrollment to the present, provided continuous enrollment is maintained throughout. See the catalog for definition of "continuous enrollment".

Program of study leading to:
Certificate of Achievement

REQUIRED COURSES—Complete the required courses for the specific Track as listed in the Associate Degree requirements box on the preceding pages.

Track 1 REQUIRED COURSES

		In Progress	Completed
TOTAL UNITS TRACK 1	**28**		

Track 2 REQUIRED COURSES

		In Progress	Completed
TOTAL UNITS TRACK 2	**34**		

Track 3 REQUIRED COURSES

		In Progress	Completed
TOTAL UNITS TRACK 3	**35**		

Track 4 REQUIRED COURSES

		In Progress	Completed
TOTAL UNITS TRACK 4	**34.5**		

For graduation with a **CBIS/CS Certificate of Achievement:**
1. Complete each of the **REQUIRED COURSES** listed above with a **minimum grade of** "**C**".
2. Complete fifty percent (50%) or more of the unit requirements for this field of concentration in residence. Credit earned by exam, where applicable, may be included.
   For **Track 1**, complete **at least 14 units** of the required 28 **at Long Beach City College**.
   For **Track 2**, complete **at least 17 units** of the required 34 **at Long Beach City College**.
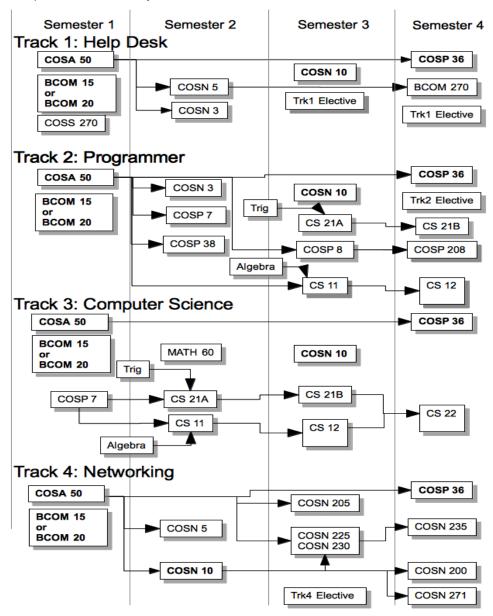   For **Track 3**, complete **at least 18 units** of the required 35 **at Long Beach City College**.
   For **Track 4**, complete **at least 18 units** of the required 34.5 **at Long Beach City College**.
3. Complete and submit the certificate application form to the Admissions and Records office during your final semester of course work. These forms are available in the Admissions and Records office, or online at http://admissions.lbcc.edu/ . Refer to the Schedule of Classes (http://schedule.lbcc.edu) and click the "Important Dates" link to view the actual deadline for each semester.

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Suggested Sequence of Courses.

This is not an educational plan, as course offerings, student schedules, and circumstances vary. Students should follow the requisite skills sequence as indicated by arrows

Semester 1	Semester 2	Semester 3	Semester 4

Track 1: Help Desk
- COSA 50 → COSP 36
- BCOM 15 or BCOM 20 → COSN 5 → BCOM 270
- COSN 3
- COSN 10
- Trk1 Elective
- COSS 270
- Trk1 Elective

Track 2: Programmer
- COSA 50 → COSP 36
- COSN 3
- COSN 10
- Trg
- COSP 7
- Trig → CS 21A → CS 21B
- BCOM 15 or BCOM 20
- COSP 38 → COSP 8 → COSP 208
- Algebra
- CS 11 → CS 12
- Trk2 Elective

Track 3: Computer Science
- COSA 50 → COSP 36
- BCOM 15 or BCOM 20
- MATH 60
- COSN 10
- Trig
- COSP 7 → CS 21A → CS 21B → CS 22
- CS 11 → CS 12
- Algebra

Track 4: Networking
- COSA 50 → COSP 36
- COSN 205
- BCOM 15 or BCOM 20 → COSN 5
- COSN 225 / COSN 230 → COSN 235
- COSN 10 → COSN 200
- Trk4 Elective → COSN 271

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Certificate: Computer Tech A+ Preparation 4126

REQUIRED COURSES		UNITS	In Progress	Completed Grade
† COSA 50	Business Information Systems	4		
† COSN 3	Operating Systems: Software and Hardware	4		
† COSN 5	Computer Technician Hardware Basics	4		
	TOTAL UNITS	**12**		

For the above certificate only, a grade of "C" or better is required in each course, and cumulative GPA of at least 3.0 must be maintained. All courses must be completed within 5 years.

Certificate: Application Developer 4087

REQUIRED COURSES		UNITS	In Progress	Completed Grade
† COSA 50	Business Information Systems	4		
† COSP 7	Business Programming Logic & Design	4		
† COSA 40	Microsoft Office - Advanced	4		
† COSP 8	Visual Basic Programming	4		
	TOTAL UNITS	**16**		

Certificate: Information Security 4106

REQUIRED COURSES		UNITS	In Progress	Completed Grade
COSN 10	Networking Fundamentals	3		
† COSS 270	Information Security Fundamentals	1		
† COSS 271	Network Security Fundamentals	3		
COSS 272	Forensics Digital Analysis and Validation	4		
COSS 273	Computer Forensics and Analysis	4		
	TOTAL UNITS	**15**		

RECOMMENDED, but not required courses		UNITS		
COSN 205	Unix/Linux Fundamentals	4		
COSN 240	MS Windows Client OS	2.5		
† COSN 225	MS Windows Server OS	2.5		
† COSN 230	MS Windows Networking	2.5		
† COSN 210AD	Linux Server Administration	4		
† COSN 215AD	Linux Networking & Security	4		

Certificate: Java Web Programmer 4083

REQUIRED COURSES		UNITS	In Progress	Completed Grade
† CS 21A	Java: Computer Science 1	4		
† CS 21B	Java: Computer Science 2	4		
† COSP 38	Database Concepts	4		
† COSW 20	Dynamic HTML Web Construction	4		
	TOTAL UNITS	**16**		

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Certificates of Accomplishment continued from the previous page:

Certificate: Microsoft Windows Systems Administration 4107

	REQUIRED COURSES		UNITS	In Progress	Completed Grade
†	COSN 240	Microsoft Windows Client OS	2.5		
†	COSN 225	Microsoft Windows Server OS	2.5		
†	COSN 230	Microsoft Windows Networking	2.5		
†	COSN 235	Microsoft Windows Directory Services	2.5		
		TOTAL UNITS	**10.0**		

Certificate: Web Construction 4108

	REQUIRED COURSES		UNITS	In Progress	Completed Grade
	COSP 38	Database Concepts	4		
†	COSW 10AD	Web Design	4		
†	COSW 20	Dynamic HTML Web Construction	4		
	Take one of the following courses:				
†	COSW 251	Introduction to ASP.NET	4		
†	COSW 220	PHP & My SQL for the Web	3		
†	COSW 230	Ruby on Rails Web Development	3		
		TOTAL UNITS	**15-16**		

	RECOMMENDED, but not required courses		UNITS		
†	COSA 50	Business Information Systems	4		
	COSN 10	Networking Fundamentals	3		
	COSN 205	Unix/Linux Fundamentals	4		

Certificate: Windows Network Administrator 4086

	REQUIRED COURSES		UNITS	In Progress	Completed Grade
†	COSN 3	Operating Systems: Software and Hardware	4		
†	COSN 10	Networking Fundamentals	3		
†	COSN 200	Wireless Communications	2		
†	COSN 225	Microsoft Windows Server OS	2.5		
†	COSN 230	Microsoft Windows Networking	2.5		
†	COSN 235	Microsoft Windows Directory Services	2.5		
		TOTAL UNITS	**16.5**		

Certificate: Business Digital Literacy 4130

	REQUIRED COURSES		UNITS	In Progress	Completed Grade
†	COSA 1	Computer Information Competency	1		
	OR				
†	COSA 30	Apps & Concepts for Non-Computer Majors	3		
	OR				
†	COSA 50	Business Information Systems	4		
		TOTAL UNITS	**1-4**		

Certificates of Accomplishment continue on the following page:

Career Opportunities

The CBIS Department has four Career Certificate programs and several Completion Certificate programs for students interested in working in the computer industry. Track 1 is intended for those students interested in working as help desk technicians assisting end-users resolve software and hardware problems. Track 2 is intended for students interested in developing computer application software in business and industry as an entry-level computer programmer on PCs, mid-range or larger sized computers. Track 3 is intended for students interested in a solid foundation of programming and software engineering skills for use in Computer Science. Track 4 is intended for students who want to know how networking is going to affect their work life, and want to understand what this technology is all about, or are trying to find out if a network would help their organization. It will also prepare students for MS Windows Certification. The CBIS department offers several Certificates of Accomplishment, many of which are also designed to prepare the student to pass industry certification exams.

The **Certificates of Achievement** will prepare students for an entry-level position in a variety of business settings:
Track 1 - Microcomputer Help-Desk Technician: PC Support Specialist, Software Support
Track 2 - Programmer – Java, C++, Visual BASIC, Oracle, and Desktop Support
Track 3 - Programmer – Computer Science
Track 4 - Networking - System Administrators or Networking Support

The **Associate Degree** will prepare students for transfer to the four-year college or university.

Program Mission and Outcomes

The mission of the department is to prepare the students for the first two years of their Information Systems/ Computer Science education. In addition, the department provides professional development and training for individuals employed or seeking entry level positions in the Computer Information Systems and Information Technology job markets.

Outcomes:
- Choose the correct application for a given task
- Problem solve common information technology failure

Legend

† This course has a prerequisite or a recommended preparation. Prerequisite courses must be complete with at least a "C" or "P" grade. Refer to the General Catalog (http://www.lbcc.edu/cat/index.html), the Schedule of Classes (http://schedule.lbcc.edu/), or the online Credit Course Outline (http://wdb-asir.lbcc.edu/coursecurriculum/coursedetails/) for specific requisite information.

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