STEM Credentials: The LSU STEM Pathways provide high school students with the opportunity to enroll in a specialized progression of up to eight project-based STEM courses to attain industry-promulgated and valued credentials, university issued certificates of course completion, or dual enrollment credit in order to graduate with either a career-tech diploma or to enhance their university-prep diploma.

Teacher Training: The LSU Pathway teachers participate in intensive, graduate-level training courses. If taken for credit, this program leads to a customized "Professional Graduate Certificate" issued by the LSU Colleges of Science or Engineering.

Financial Model: BESE approved the LSU Pre-Engineering Pathway in June 2017; the Digital Design & Emergent Media Pathway is currently under consideration. Under provisions of the approved state education funding formula, a school district offering a BESE approved LSU Pathway course receives $480 per student per course in additional CTE base weight and Career Development Funds.

Scalability: The curricula for all LSU Pathway courses are standards-based and open source.

LSU STEM Pathway Courses (Sample Flowchart)				
	(1) Pre-Engineering Statewide Rollout 2017-18	**(2) Digital Design & Emergent Media Statewide Rollout 2018-19**	**(3) Computational Thinking & CS (Draft) Statewide Rollout 2019-20**	**(4) Biomedical Sciences (Draft) Statewide Rollout 2020-21**
9th Grade	*Intro to Engineering Design*	*Digital Storytelling*	*Exploring Computer Science*	*Introduction to Biomedical Sciences & Science Foundations and Ethics*
	Intro to Computational Thinking	*Photography or Intro to Computational Thinking*	*Intro to Computational Thinking*	*Intro to Computational Thinking*
10th Grade	*Introduction to Robotics*	*Digital Image or Motion Graphics*	*Computer Science I*	*Comparative Anatomy Physiology, Forensic Science*
	Programming for Engineers	*Programming for Digital Media*	*Modeling and Simulations*	*Modeling and Simulations*
11th Grade	*Principles of Engineering*	*Sound Design or Film & Television*	*Computer Science II*	*Ecology Lab*
	Data Manipulation and Analysis	*Coding for the Web*	*Data Manipulation and Analysis*	*Data Manipulation and Analysis*
12th Grade	*Engineering Economy*	*Film & Television or Video Game Design*	*Computer Science III*	*Biochemistry or Microbiology*
	Engineering Design and Development	*Interactive Digital Media Capstone*	*Ubiquitous Computing*	*Research Methodology or Coastal Studies*

Cells highlighted in blue represent core pathway courses; white cells represent sample electives. The order of some courses can be rearranged and other LSU approved electives can be substituted as needed.

Pathway Courses: The curricula for the LSU STEM Pathway courses first took shape at Lee High School in Baton Rouge (Lee HS) in collaboration with LSU faculty. Their four "Early College Academies" in
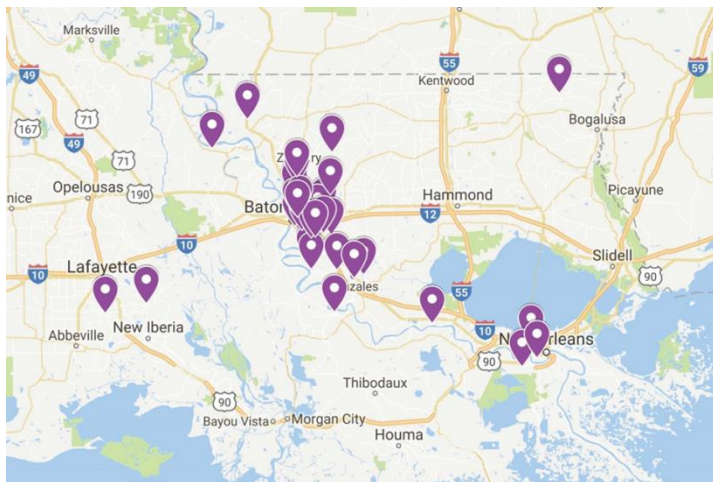
(1) Engineering,
(2) Digital Media & Arts,
(3) Computational Thinking & Computer Science, and
(4) Biomedical Sciences

offer STEM pathways that serve all students at the school. The Pathway courses are often takes as electives in addition to the standard academic core, dual enrollment, and AP-level classes. Common themes reflected in all pathway courses are

- computational thinking and computer science,
- data management and analysis,
- development of 21st-century skills such as critical thinking, problem solving, communication, collaboration, and appropriate use of technology,
- Cultivation of acumen in areas that contribute to success in STEM-related fields such as research & analysis, innovation & creativity, and professional ethics.

These common threads give 9th and 10th grade students transferable skills that make it easier for them to switch pathways should they decide to do so.

Statewide Rollout: The statewide rollout of the pathways is a joint effort of the Louisiana Department of Education, the LSU College of Engineering and Gordon A. Cain Center for STEM Literacy, and Lee

2018-19 Pre-Engineering Pathway Schools

HS. The statewide expansion of Pathway (1) began in 2017-18 at eight high schools in: Central, City of Baker, East Baton Rouge, Iberville, Pointe Coupee and West Feliciana. In 2018-19 we added twenty additional middle and high schools (Scotlandville HS, Belaire HS, Istrouma HS, Broadmoor HS , Northeast HS, Woodlawn MS, Glasgow MS, Mayfair Lab MS, Parkview Baptist, Dunham School, Saint Martinville HS, Dutchtown HS, Donaldsonville HS , Haynes Academy, St. Amant, East Ascension HS, Pine HS, St John the Baptist MHS, Acadiana Charter MS, De LaSalle HS). Pathway (2) will be piloted at five regional

schools in 2018-19, followed by (3) in 2019-20 and (4) in 2020-21.

Jump Start: Jump Start is Louisiana's premier career and technical education program that prepares students to lead productive adult lives in high-wage sectors. Students enroll in a specialized progression of courses called pathways in order to graduate with a career diploma or to enhance their university-preparatory diploma. The LSU STEM Pathways offer a first-of-its-kind hybrid curriculum that can be applied to either diploma track. If a student takes eight Pathway courses, then the student can graduate with a career-tech diploma; if a student takes only a few Pathway courses, then the Pathway Course Certificates received will enhance their university-prep diploma.

In June 2017, the Louisiana Board of Elementary and Secondary Education (BESE) decided to approve the LSU Pre-Engineering Pathway as one of the 40+ Louisiana Jump Start Career Pathway options. The LSU Digital Media & Art Pathway courses will go up for approval for the 2018-19 school year, followed by the Computational Thinking and Computer Science Pathway courses in 2019 – 20, and a Biomedical Sciences Pathway in 2020-21.

Memorandum of Understanding: Students taking Pathway courses with a trained teacher will be eligible to earn LSU STEM Pathway Certificates and the school district will receive $480 per student per course from the Louisiana Department of Education's Career and Technical Education JumpStart funds. A school does not have to commit to implement all of the Pathway courses; as long as any one Pathway course is taught by a trained teacher, the school district will receive $480 in JumpStart funding for each participating student receiving a LSU Certification of Course Completion.

For a high school teacher to be able to participate, his/her high school must sign a Memorandum of Understanding (MoU) with LSU in which the school commits to

- providing a dedicated computer lab or one-to-one technology usage with internet
- piloting each course that the participating teacher is being trained for, and
- paying LSU a $96 administrative fee for each student for which LSU issues a Pre-Engineering Pathway Certificate of Course Completion and for which the school system receives $480 in JumpStart funding.

Teacher Training: For a school to be able to offer courses within the LSU Certification Pathway framework, teachers must attend an intensive summer training program in Baton Rouge for two summers; this year's dates are May 29 to July 3, 8am-5pm. In the Summer Training Institute, we are providing intensive, graduate level training for motivated and engaged high school teachers to instruct the next generation of engineers and computer science learners. Participants do not need to have any background knowledge or prior training in Engineering or Computer Science. Funding is provided by the Louisiana Department of Education through its Math & Science Partnership (MSP) program for teachers from West Feliciana, Baker, City of Monroe, Ascension, Pointe Coupee, Central and EBRPSS.

Limited additional funding is available for teachers from other public and private Louisiana high schools. Also, funding for teacher training is provided by the School Systems themselves using the $480 they receive per student per course from the Louisiana Department of Education's Career and Technical Education JumpStart fund.

2018 Pre-Engineering Summer Institute			A. Intro to Robotics Lecture (8:00-10:30AM)	A. Intro to Robotics Lab (10:45 AM - 1:45 PM)	D. Robotics Extension Part 1 (2:30 - 5:00 PM)
	Session 1	Week 1	Tuesday, May 29		
			Wednesday, May 30		
			Thursday, May 31		
			Friday, June 1		
		Week 2	Monday, June 4		
			Tuesday, June 5		
			Wednesday, June 6		
			Thursday, June 7		
		Week 3	Monday, June 11		
			Tuesday, June 12		
			Wednesday, June 13		
			Thursday, June 14		

			B. Intro to Engineering Part 1 (8:00 - 10:30 AM)	B. Intro to Engineering Part 2 (10:45AM - 1:45PM)	D. Robotics Extension Part 2 (2:30 - 5:00PM)
	Session 2	Week 4	Monday, June 18		
			Tuesday, June 19		
			Wednesday, June 20		
			Thursday, June 21		
			Friday, June 22		
		Week 5	Monday, June 25		
			Tuesday, June 26		
			Wednesday, June 27		
			Thursday, June 28		
			Friday, June 29		
		Wk 6	Monday, July 2		
			Tuesday, July 3		

Participants must take all blocks of the same color to complete one course and be eligible to teach the course in 2018-19. Participants from West Feliciana, Baker, City of Monroe, Ascension, Pointe Coupee, Central, and EBRPSS are eligible for a $1,600 stipend at the end of the summer for each course they take ($3,200 for two courses and $4,800 for taking all three courses). Interested teachers can also obtain three hours of graduate credit per course that can be applied to various graduate certification and/or master's programs of the LSU College of Engineering or the LSU College of Science.

Additional financial support to help with tuition and fees is available.

High school teachers interested in familiarizing themselves with the 9th grade Pre-Engineering Pathway course _Introduction to Computational Thinking_ participate in the Intro to Computational Thinking course of the Summer Institute as outlined in the table to the right. This course counts double; that is, participants from West Feliciana, Baker, City of Monroe, Ascension, Pointe Coupee, Central, and EBRPSS will be eligible for a $3,200 stipend and six hours of graduate credits ($4,800 for teachers who also take an additional lab or one of the elective math/statistics courses offered during the Summer Institute).

2018 Pre-Engineering Summer Institute	Introduction to Computational Thinking Lecture and Lab (8:00 AM -1:45 PM)	Elective or Lab (2:30 PM - 5:00 PM)
Tuesday, May 29		
Wednesday, May 30		
Thursday, May 31		
Friday, June 1		
Monday, June 4		
Tuesday, June 5		
Wednesday, June 6		
Thursday, June 7		
Monday, June 11		
Tuesday, June 12		
Wednesday, June 13		
Thursday, June 14		
Monday, June 18		
Tuesday, June 19		
Wednesday, June 20		
Thursday, June 21		
Friday, June 22		
Monday, June 25		
Tuesday, June 26		
Wednesday, June 27		
Thursday, June 28		
Friday, June 29		
Monday, July 2		
Tuesday, July 3		

Academic Year Follow-Up: During the 2018-19 school year, participating teachers need to attend ten Saturday sessions that are designed to assist with course implementation issues. All participants will receive a $1,200 stipend and can obtain three hours of graduate credit for the ten Saturday training sessions (participants who cannot travel to LSU will be able to participate virtually).