

## **STS.088 AFRICA FOR ENGINEERS**

**Time:** Wednesday 7-10pm

**Venue:** <https://mit.zoom.us/j/94258340116>

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### **Introduction: Why Africa for Engineers?**

Very often, those charged with development, investment and innovation have little historical, sociological, cultural, and political understanding of the “engineering problem” they wish to solve. The problem is that while still in university, the humanities, arts, and social science (HASS) classes they take (if ever they do) hardly ever deal with engineering. Engineering students, by contrast, are seldom exposed to critical thinking skills, which the HASS are supposed to provide. The engineering courses are often too technical in their language and content for HASS students. At best they end up blunt tools with limited application or relevance to everyday life. Africa shows not only that history, culture, and politics determine the specific context within which engineering is practiced; equally important, everyday life is an open laboratory full of creative resilience as people negotiate seek to live and prosper, often against impossible odds. Time after time, projects that are socially well-meaning, technically brilliant, and commercially viable fail because of a lack of the awareness of where Africans are coming from, their values as a people, and the nature of their politics and ways of navigating them.

### **Aims and Objectives**

Therefore, the aim of this course is to immerse students in the historical, cultural, ethical, and contemporary dimensions of engineering in Africa so that they will become better engineers capable of deploying their skills in multi-cultural contexts. Our objective is to train a student who is comfortable working at various sites of problem-solving in Africa, whether it is sites of everyday forms of making by ordinary people in ‘informal settings.’ Or the construction of big projects like cities, hydroelectricity dams, roads, railway lines, ports and harbors, transport and communication, mines, industrial processing plant, and plantations. Or the contributions and convergence of African and incoming capital and machinery, engineers, politicians, and ordinary people in these key infrastructural developments. Or focusing on something closer home, the power in our own hands right here that could revolutionize how innovation and development is done in Africa, such as looking at MIT as a force for mutually rewarding engagement with the continent. This last is the Class of 2021’s focus.

### **What You Will Get from this Course**

Depending on each year’s thematic, by the end of the course students will expect to have acquired any or all of the following skills or knowledge 1) critical thinking skills that will enable them to also be doers or problem-solvers 2) to approach Africans as not merely people full of problems for them to solve, but partners in problem-solving that are armed with everyday knowledge; 3) the etiquette and diplomatic skills to work with people whose history, culture, politics, and levels and type of education differ from their own; and 4) an awareness of MIT’s engagement with Africa and how students can shape it.

### **Course Format**

Africa for Engineers is sequenced into three phases. In **Week 1-3**, it will immerse students in the historical, cultural, ethical, and contemporary dimensions of engineering in Africa so that they will

become better engineers capable of deploying their skills in multi-cultural and interdisciplinary contexts. In **Week 4**, it will introduce them to research and analytical methods they require to problematize and investigate an engineering problem, and how they can use their specific engineering skills to address specific social, economic, or political problems. Weeks 1-4 is also the time when students are paying close attention and making individual lists of problems/opportunities that they will address. **The rest of the term**, therefore, will involve student undertaking a supervised group research and problem-solving project, first identifying one specific problem, then deploying research methods learned in class to investigate it, and their various skills learnt at MIT to solve the problem together.

### **Class Mechanics I: Weeks 1-4 Only**

Pre-class: Students will read, watch, and listen to assigned materials before class. They will be required to take notes of their readings and submit them in bullet points (1 page max) by 7pm Tuesday (24 hours before class). Students must take note that the instructor will not be able to read the notes if late and that will affect their grade. These notes will be submitted in bullet points (1 page maximum) with the by 7pm Tuesday (24 hours before the next class).

In-Class: The class has a 3-hour slot. We start by 5-after the hour so please be early. The first 45 minutes will be a lecture to give historical, political, socio-cultural and technological context to enable the students to better understand the assigned readings; students will take notes but hold off questions. We will have a 30-minute Q&A and comments session specifically on the lecture. The last half of the class will be devoted to the assigned readings/materials. In the first 35 minutes students will discuss the readings, and link them to what they have learned from the lecture. The last 45 minutes will be a discussion of the main points that students have raised in their groups. Students will be assessed for in-class participation, which involves active contribution through speaking and listening without distracting or undermining others, and taking notes of/during lectures.

Post-class: The group discussion notes will be deposited to the class site by 7pm each Wednesday; however, it is critical that every student takes notes because their specific interpretation, and any follow-up Q&A responses, as well as the readings discussions, constitute the materials that will help them execute their specifically assigned role in the project. The group discussion notes, assigned to one note-taker (rotating each week), and specifying who has contributed what point, will be submitted to the professor by 7pm Wednesday (next day) for record-keeping and grading purposes. These are some of the resources the group will deploy, along with their research, when compiling their group project report due last day of class.

### **Course Format II: Weeks 5-14 Only**

Pre-class: During Weeks 5-10 (group research phase), students are expected to conduct at least one hour-long interview (or more) per week with a pre-agreed interviewee. 48 hours before class they will upload it to the course website, as well as prepare a brief 3-minute report summarizing its main findings for presentation in class. All students are expected to listen to these tapes and come prepared to discuss and field questions. From Weeks 11-14, students will work as a group on their final (write-up) assignment and will prepare an update on progress made on the project for presentation in class.

In-class: From Week 5 to Week 10, the focus will be on research. Students will take turns to present to the instructor and their colleagues snapshots of the interviews they have conducted for the week in the first 60 minutes. They will get responses on issues that need follow up and answer any follow-up questions. This round of feedback will take up the first 90 minutes of the course (more or less depending on class size). The last 90 minutes are devoted to tactical and logistical planning for the next set of interviews. In the

first hour of each class in Weeks 11-14, students will present brief progress reports on the write-ups and receive feedback from the instructor. They will use the remaining time to work on their write ups.

Post-class: During Weeks 5-10, students will conduct at least one interview each, to be uploaded on the course website 48 hours before the next class meeting. During Weeks 11-14, students will spend at least 3 hours on their group project write-up.

## **2021 Theme and Group Research & Write-Up Assignment**

The class of Fall 2018 explored the history of MIT-Africa engagement, with a view to shaping the institute's engagement of Africa through the MIT-Africa initiative. The class worked closely with MIT Libraries to look into the history of MIT engagement with Africa since 1861; where the institute recruited from and where the alumni went after MIT; the funding for MIT-Africa engagement; and the official positions MIT has taken regarding the Civil Rights Movement and the Anti-Apartheid Struggle, which were not always positive. Students had started—barely—to interview staff, faculty, and alumni engaged in the MIT-Africa Initiative, but there are significant gaps which this class will fill. Your role as the Class of 2021 is to undertake interviews of faculty, staff, students, and alumni of African descent, and then, based on what such interviews reveal, have a virtual sit-down with the associate provost who is responsible for global initiatives. This conversation and the interviews will be curated as archives and uploaded onto the class site. Additionally, alongside the materials collected by the Class of 2018, these 2021 interviews will constitute the archives upon which the students will write their group project titled “Modelling a sustainable MIT-Engagement future.”

The research/interviews will be guided by the following questions and activities:

1. What do MIT students of African descent think about MIT-Africa engagement? What do they want to see? What speculative or concrete ideas do they have? And what role do they envisage while still at MIT and, later, as alumni? The African Students Association and the Black Students Union are the best places to start.
2. What do MIT faculty of African descent think about MIT-Africa engagement? What do they want to see? What speculative or concrete ideas do they have? (There are 43 black faculty at MIT out of 1,067 faculty in total).
3. Where are MIT alumni of African descent and what are they doing? What (more) could they do in shaping the institute's role in Africa? What speculative or concrete ideas do they have?
4. A virtual sit-down with associate provost Richard Lester on MIT's Africa strategy now. The interview will follow-up on the insights drawn from 1-3.
5. Final group project: “Modelling a sustainable MIT-Engagement future.”

The goal of this group project is for students to help MIT shape its engagement with Africa and the world at large through rigorous research and evidence-based recommendations. It will be no more than 10,000 words in

## **Grading Allocations**

Class participation (throughout) 10%

Weekly notes (of readings, lecture, and group discussion notes) (week 2-4 only) 10%

Group Research (grade based on specially assigned role in group assignment) 45%

Write-up (turning the research into reports, with concrete recommendations). All the materials collected will be uploaded to the website) 35%.