



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Aeronautical Engineering and Aviation Management

AEM

B.Sc. Credit Hours Program



Aerospace Department

New Students



Content

1. Aviation world
2. Program Basic Features
3. World growth of airtransport
4. Engineering Maintenance
5. Aviation Management



1. Aviation World



How much is a civil airplane?

Airplane	No Passengers	Range [NM]	Price [M\$]
A319	120	3600	92.3
A319neo	150	3750	101.5
A321neo	180	3750	129.5
A330-200	230	7250	238.5
A330-800	300	8150	259.9
A330-300	406	8300	264.2
A350-1000	440	8250	366.5

- ★ very precious
[Billions EGP]
- ★ Top technology
- ★ Internationally
regulated
- ★ Relatively highly
rewarded



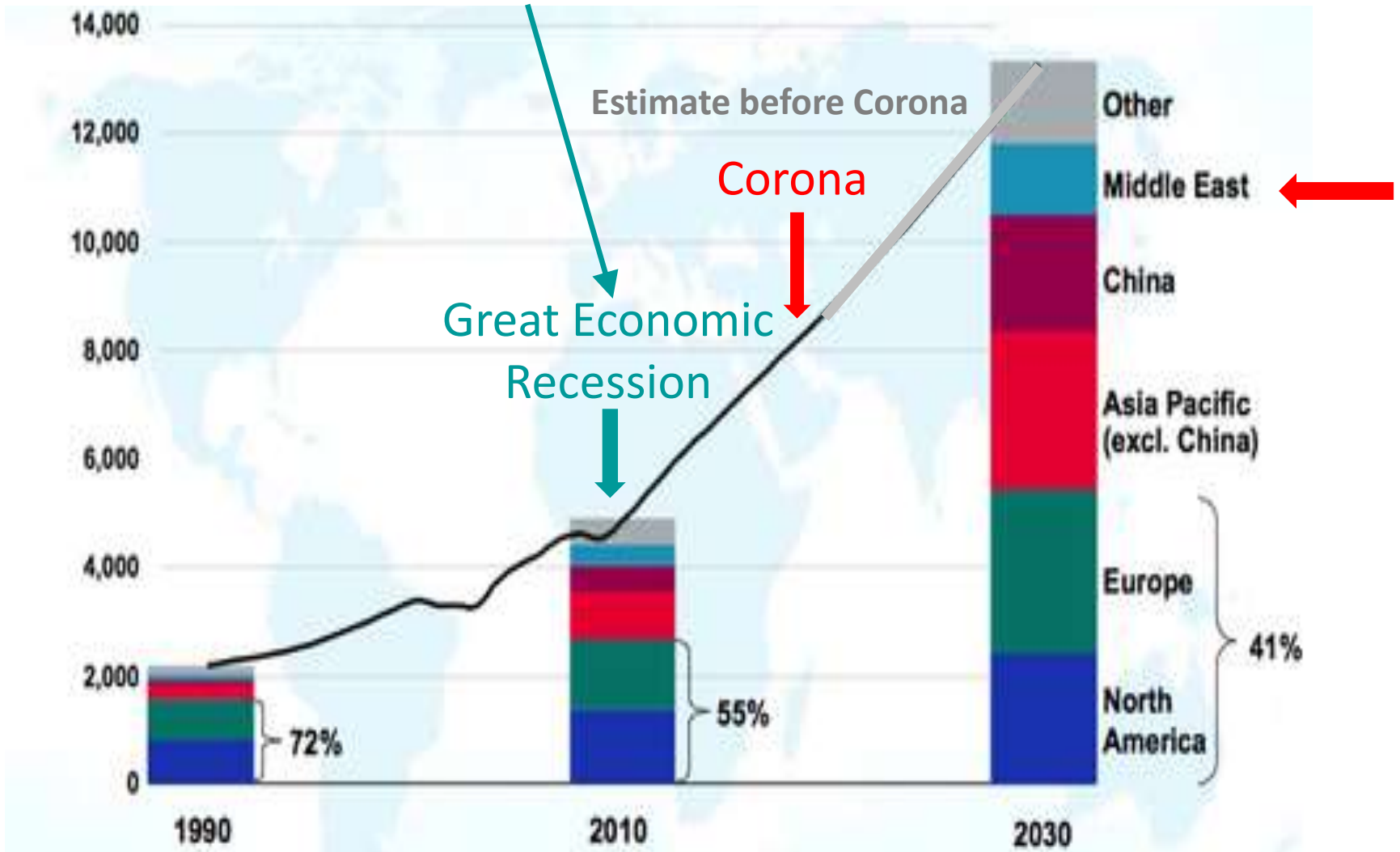
2. World Growth of Airtransport



Passenger Demand Growth 1990-2030

Airtraffic Revenue Passenger Kilometers (RPK) Billions

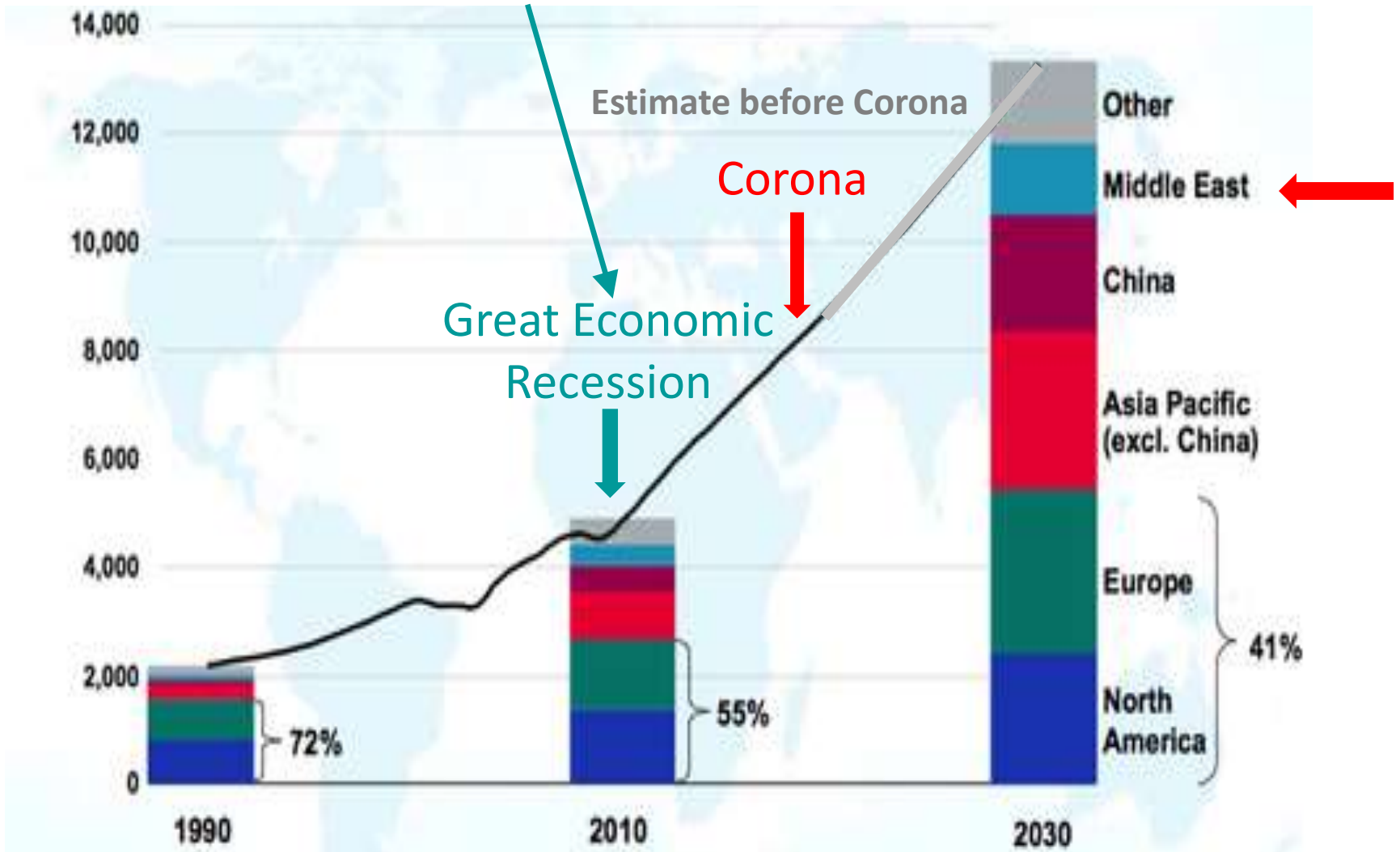
Note Airtraffic has recovered quickly after great recession 2008



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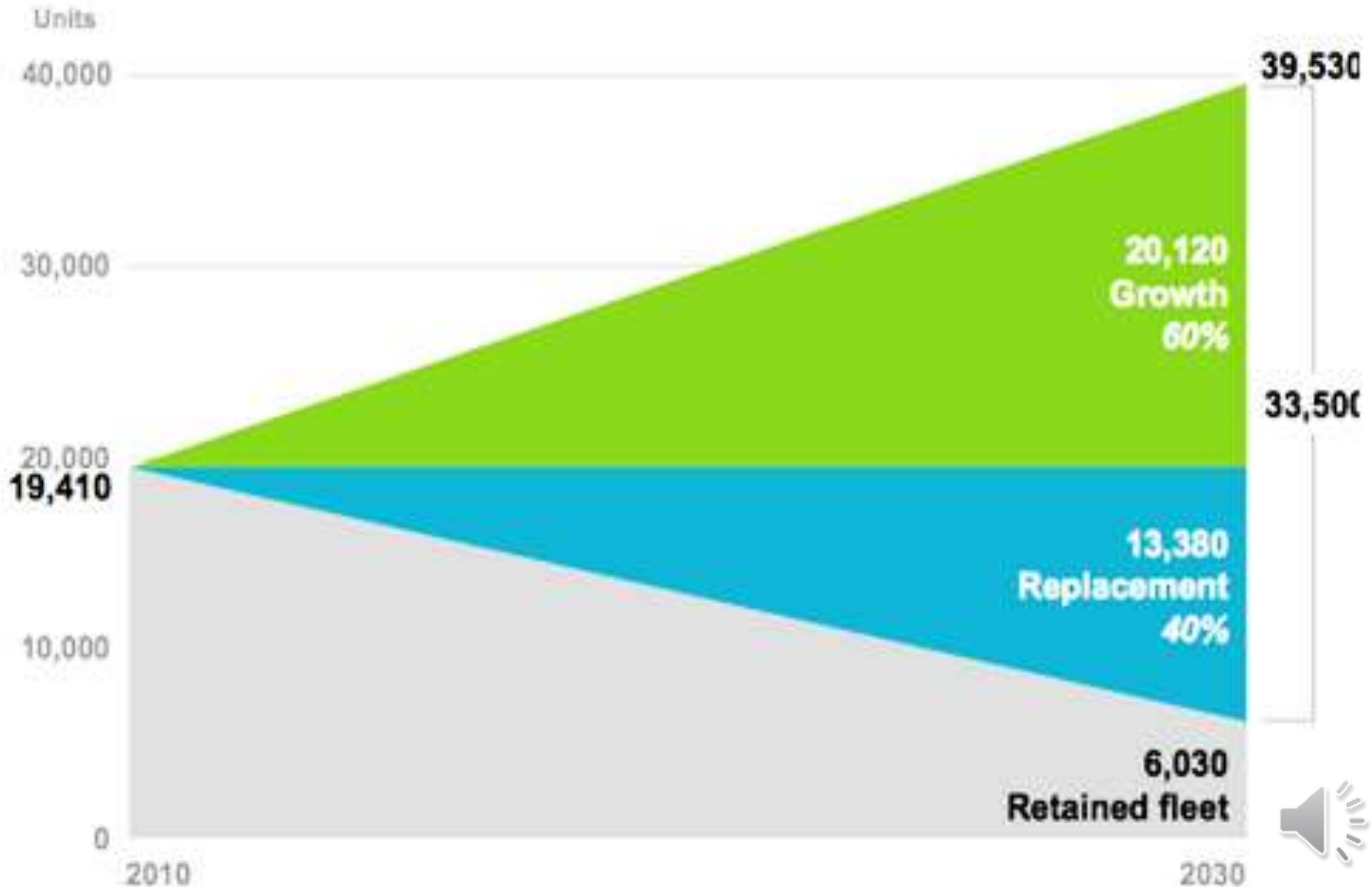


Air traffic growth by area

Area	Passenger annual growth	Freight annual growth
Africa	6.1%	6.9%
Middle East	5.9%	6.3%
Asia	6.0%	5.7%
Latin America	5.8%	5.5%
Europe	3.7%	3.1%
North America	3.1%	2.9%



World Fleet Forecast 2010-2030



Post Corona Forecast



Boeing says Global air travel to return to pre-pandemic levels by 2024.



Airbus 2020 - 2040 Forecast

- ★ The demand for new aircraft includes around 29,700 Small aircraft like the A220 and A320 Families. About 5,300 in the Medium aircraft category such as the A321XLR and the A330neo. In the Large segment 4,000 deliveries covered by the A350.
- ★ Having lost nearly two years of growth over the COVID period, passenger traffic has demonstrated its resilience and is set to achieve an annual growth of 3.9% per year.

شركات الخطوط الجوية المصرية

مسلسل	شركة	إيكاو	إياتا	سنة التأسيس	النوع
1	<u>مصر للطيران</u>	MSR	MS	1932	حكومية
2	<u>اير كايرو</u>	MSC	SM	2003	خاصة
3	<u>المصرية العالمية للطيران</u>	LMU	UJ	2008	خاصة
4	<u>العربية للطيران مصر</u>	RBG	E5	2009	خاصة
5	<u>النيل للطيران</u>	NIA	NP	2008	خاصة
6	<u>الأهلية للطيران</u>			1986	خاصة
7	<u>خطوط إيه إم سى الجوية</u>	AMV	9V	1988	خاصة
8	<u>الإسكندرية للطيران</u>	KHH	XH	2006	خاصة
9	<u>الكان للطيران</u>			1996	خاصة
10	<u>تراي ستار إير</u>	TSY	YS	1998	خاصة
11	<u>خدمات البترول الجوية</u>	VPS	PS	1982	خاصة
12	<u>خطوط كورال بلو الجوية</u>	KBR	K7	2006	خاصة
13	<u>سمارت للطيران</u>	SME	M4	2007	خاصة
14	<u>سيناء للطيران</u>	ASD	4D	1982	خاصة
15	<u>فلاي ايجيبت</u>			2014	خاصه
16	<u>القاهرة للنقل الجوي</u>	CCE		1998	خاصة
17	<u>لوتس للطيران</u>	TAS	T2	1997	خاصة
19	<u>مفيس للطيران</u>	MHS		1995	خاصة
20	<u>ميدويست للطيران</u>	MWA	MY	1998	خاصة
21	<u>نسما للطيران</u>	NMA	NE	2010	خاصة

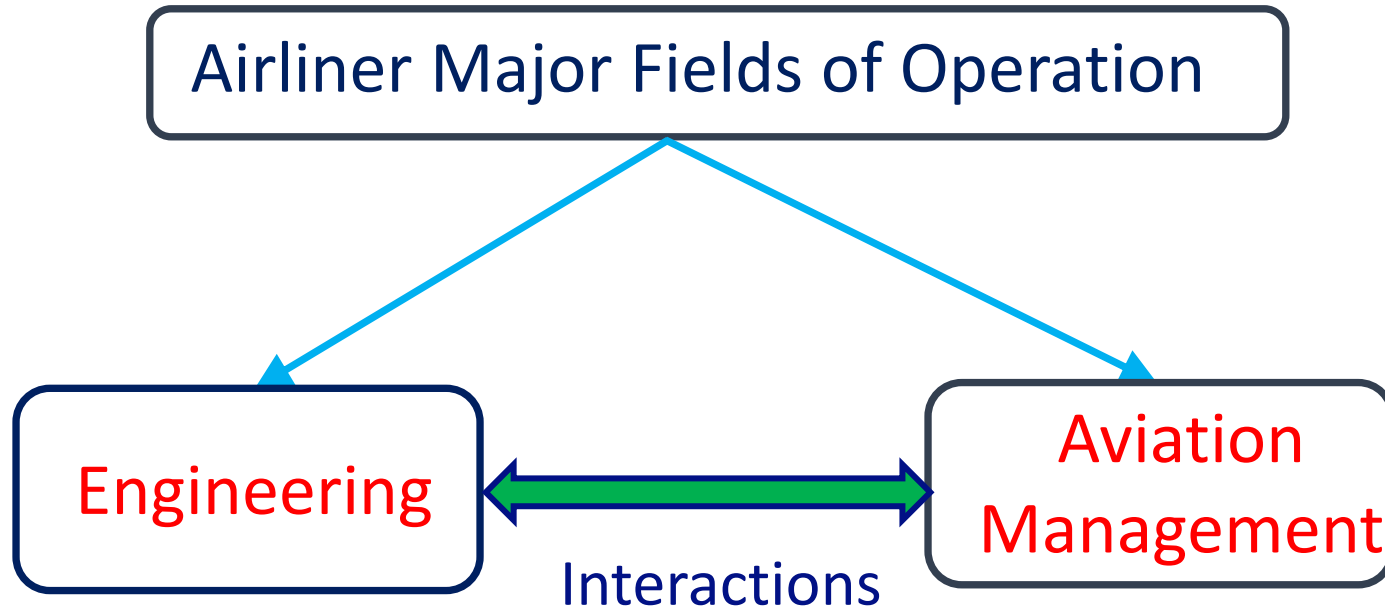


3. Program Outlines



Aeronautical Engineering and Aviation Management

Program Outlines



- ★ Interactions between engineering “maintenance” and aviation management is vital and essential for **Safety, availability/scheduled service timing and cost minimization.**
- ★ This Type of engineers with both backgrounds is this program target.



Characteristics of AEM Credit Hours Program

- ★ **Basic aeronautics foundation**
- ★ **Engineering Maintenance**
- ★ **Aviation Management**

Maintenance and Management in almost most educational institutes are treated as separate identities. Each covering 3-4 academic years. We cover both in 5 years. Such program is one of very few worldwide.



Program Outlines

Aeronautical Engineering and aviation Management			
Basic Science	Basic Aeronautics	Applied	
		Eng. Maint.	Aviation Mang
23%	32%	33%	
Math	Aerodynamics	Common mixed core 21%	
Physics	Structures		
Mechanics	Aero Engines	Maintenance Specialty 12%	Management Specialty 12%
Chemistry	Control systems		



Aeronautical Base



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graph TD; A[Aeronautical Base] --- B[Aerodynamics]; A --- C[Structures]; A --- D[Propulsion]; A --- E[Control]
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Aerodynamics

Structures

Propulsion

Control



Sample Management Topics

- ★ Airtransport System Analysis
- ★ Airline Operation and Management
- ★ Aviation Economics
- ★ Strategic Planning and Management
- ★ Maintenance systems Management and Reliability
- ★ Human Resources Management
- ★ Logistics and Transportation



4. Engineering Maintenance



Engineering Maintenance

- ★ While most maintenance programs are descriptive our program includes **analysis capabilities within the courses.**

Samples include:

- Hydraulic and pneumatic systems
- Analysis of fluid systems
- Stress analysis for metallic and composite materials
- Control systems



5. Aviation Management

- ★ Managing airtransport of specified **network** of destinations is a very involved topic. It is essential for **profitable** operation of a **fleet** of airplanes serving such network.
- ★ This covers operating and managing the **fleet of airplanes, personnel** (including flight crew, maintenance technicians,...), and in addition, managing the **maintenance tasks** and work force.
- ★ Aviation management is as sophisticated as engineering.



Fleet Assignment



Network of **flight destinations** and forecast of **number of passengers**

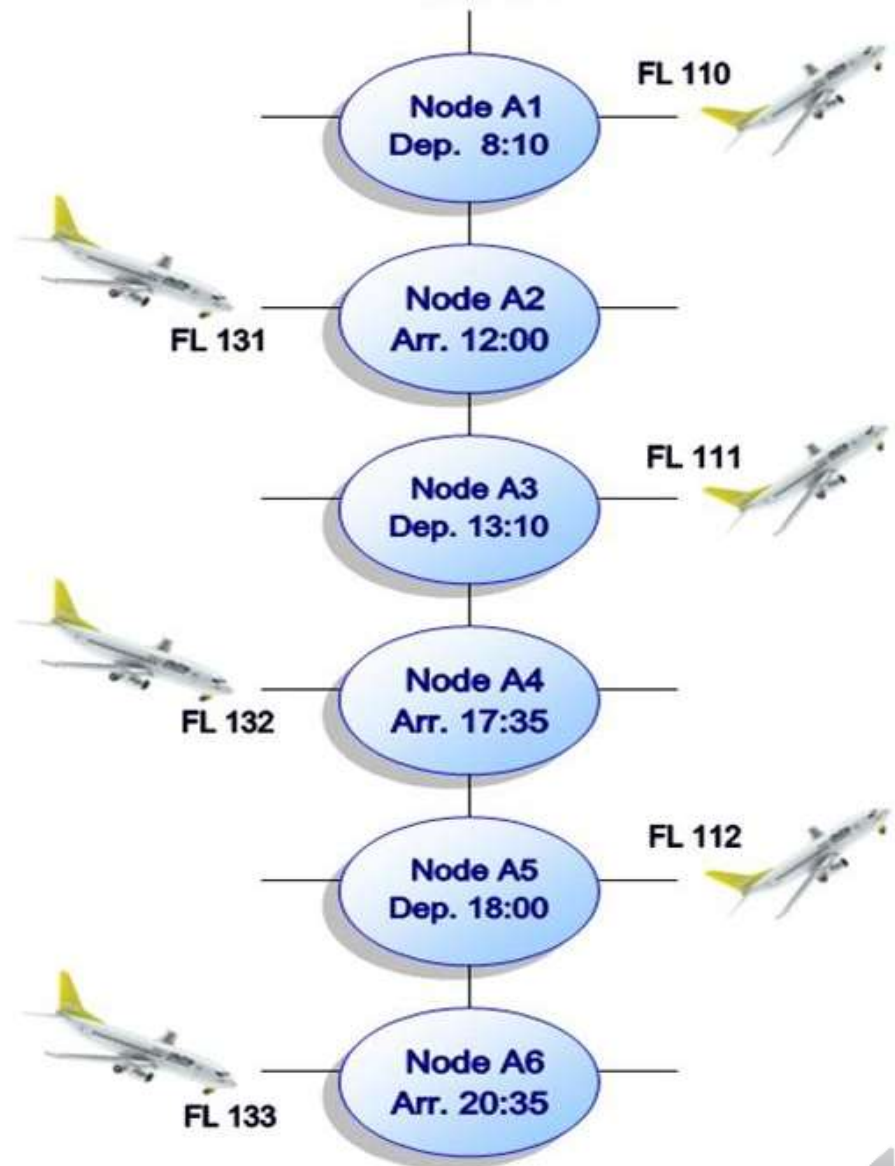
We need to answer what is the best fleet to cover the task

- 1. Types of airplane?
- 2. Numbers of each type?



Fleet Routing

- ★ Which Airplane to fly which trip?
- ★ How to arrange maintenance with flight schedules?
- ★ How to load crew?



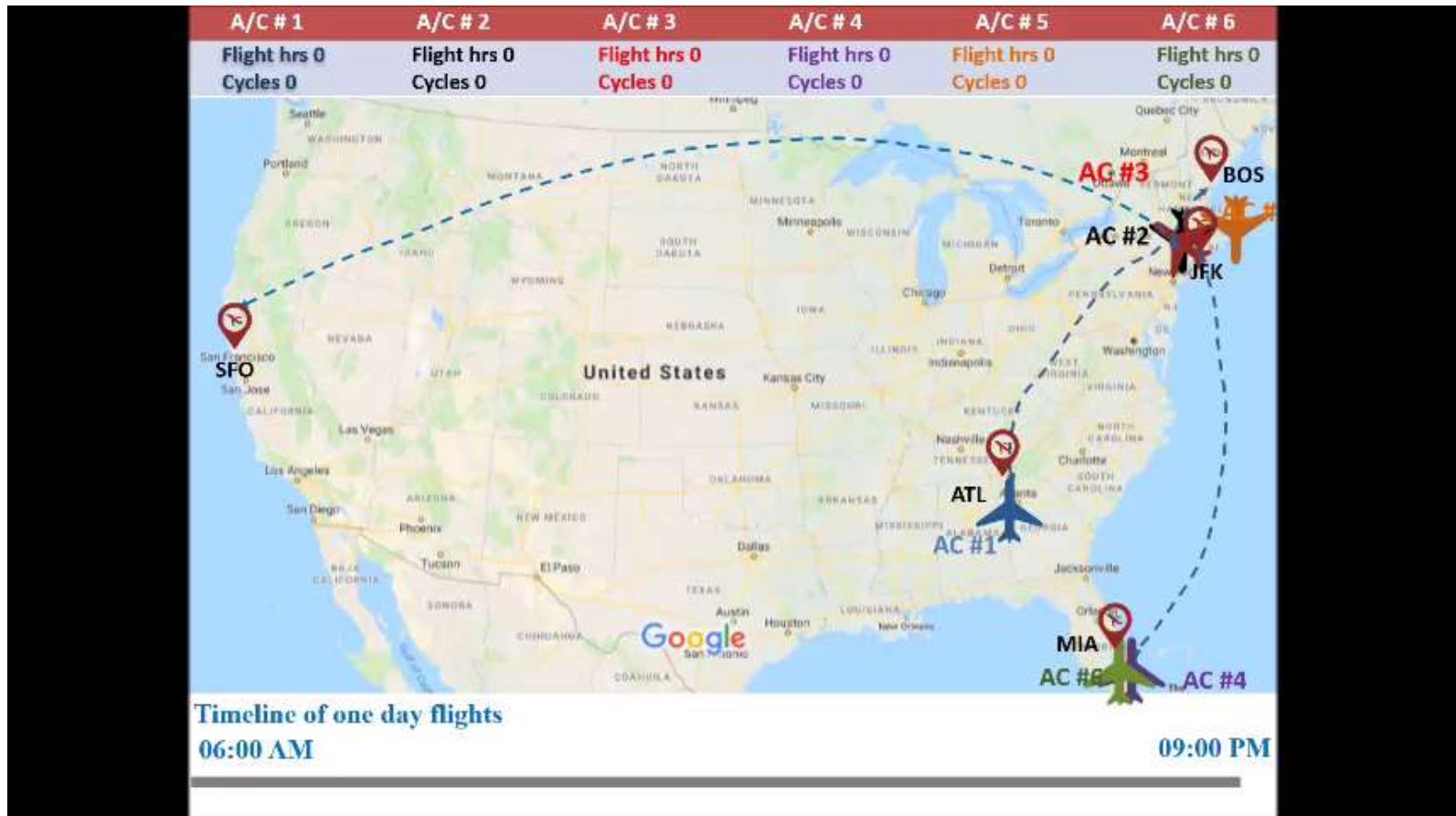
Airplane Routing



Airplane Routing One Day Schedule



Airplane Routing One Day Schedule



Thank you

