**Outline for ICM**

**Unit 1: Review of functions**

a) Lines

Slope

Midpoint

Point slope equation of a line

Textbook: Ch 13 Coordinate Geometry

Ch 16 Linear Models

b) Exponent review

Laws of exponents

Simplifing expressions with positive and negative exponents

c) Polynomials (with positive and negative exponents)

Graphs

Asymptotes

Positive/Negative

Increasing/Decreasing

Max/Min

Textbook: Ch 19 unfamiliar functions

**Unit 2: Calculus**

a) Limits

Using graphs

Using tables

Not algebraically

b) Derivatives

Using definition-examples only

Power rule

Tangent line at a point

Normal at a point

Texbook: Ch 20

c) Applications of derivatives

Optimization

Texbook: Ch 21

**Unit3: Statistics**

a) Descriptive statistics

Frequency Tables/relative frequency

Cumulative frequency graphs

Box and whisker/IQR

Standard deviation

Texbook: Ch 6

b) Normal Distributions

Empirical rule

Normalcdf and invnorm

z-scores

Textbook: Ch 10

c) Two variable Statistics

Linear regression

Correlation coefficient

Chi-square test

Textbook: Ch 11

**Unit 4: Sets and Venn Diagrams**

a) Sets and set notation

intersection

Union

Compliment

Texbook : Ch 7

b) Venn diagrams

Applications

Texbook: Mathematical ideas

**Unit 5: Probability(???)**

Addition property

Multiplication Property

Conditional

Independent events

Textbook: Ch 9

**Unit 6: Logic**

a) Truth tables

And

Or

Either or

If then

IFF

Demorgan’s Laws

Textbook: Ch 8 and Mathematical ideas

b) Arguments

Euler

Truth tables

Common argument forms

**Unit 7: Graph Theory**

a) Scheduling

EST

Critical path

b) Circuits and Paths

Euler

Hamiliton-Brute force, Nearest Neighbor, Cheapest Lint

Spanning Trees-Minimal Spanning Tree

Texbook : Excursions and modern mathematices

**Unit 8: Election theory**

a) Voting

Plurality

Majority

Borda

Plurality with elimination

Pairwise

b) Weighted Voting

c) Apportionment

Textbook: Excursions in Modern Mathematics

**Unit 9: Fair Division**

a) Continuous

Divider/Chooser

Lone Divider

b) Discrete

Method of sealed bids

Method of markers

Textbook: Excursions in Modern Mathematics