week		start	stop	#pages	Fluids Readings for CM3110 Morrison 26Sept2017
1	1.1	3	8	5	Introduction
1	~~1.2~~	~~8~~	~~49~~	~~41~~	~~Quick start MEB~~
1	~~1.3~~	~~49~~	~~90~~	~~41~~	~~Math~~
1	1.34	91	93	2	Practical advice
2	2.1	106	113	7	viscosity
2	2.2	113	118	5	drag
2	2.3	118	127	9	boundary layers
2	2.4	127	137	10	laminar versus turbulent
2	~~2.5-2.10~~	~~137~~	~~157~~	~~20~~	~~complex fluid mechanical behavior~~
2	~~2.11~~	~~157~~	~~158~~	~~1~~	~~rigid bodies~~
2	3.2.1	175	186	11	The Continuum model, field variables, continuum hypothesis, fluid particles
2	3.2.2	187	189	2	Intro to the control volume
2	~~3.2.2.1~~	~~190~~	~~194~~	~~4~~	~~Derive Reynolds transport theorem~~
2	3.2.2.2	194	198	4	Example 3.6, Example 3.7 flow rate, only
2	~~3.2.2.2~~	~~198~~	~~206~~	~~8~~	~~Derive Reynolds transport theorem~~
2	~~3.2.3~~	~~206~~	~~218~~	~~12~~	~~Problem solving with control volumes~~
2	3.3	218	219	1	summary
3	4.1	229	236	7	forces on a control volume
3	~~4.2~~	~~236~~	~~283~~	~~47~~	~~Hydrostatics~~
3	4.3	283	284	1	intro to fluids in motion
3	~~4.3.1~~	~~284~~	~~293~~	~~9~~	~~derive total molecular stress~~
3	4.3.1	293	298	5	note equation 4.263, and examples that follow
3	~~4.3.1.2~~	~~298~~	~~301~~	~~3~~	~~stress sign convention~~
3	4.3.1.2	301	308	7	note equation 4.285 and examples that follow
3	~~4.3.1.2~~	~~308~~	~~320~~	~~12~~	~~lift; control volumes~~
3	~~4.4~~	~~320~~	~~333~~	~~13~~	~~free surface effects~~
4,5,6	5.1.1	346	351	5	stress-velocity relationships, intro
4,5,6	~~5.1.2~~	~~351~~	~~359~~	~~8~~	~~stress field~~
4,5,6	5.1.3	360	361	1	viscosity
4,5,6	~~5.1.3~~	~~362~~	~~364~~	~~2~~	~~molecular interpretation of viscosity~~
4,5,6	5.2	364	369	5	Newtonian fluids
4,5,6	5.2.1	369	379	10	Constitutive equation
4,5,6	5.2.2	379	386	7	Using the constitutive equation
4,5,6	~~5.2.2~~	~~386~~	~~390~~	~~4~~	~~Right angle bend~~
4,5,6	5.2.2	390	392	2	Example 5.10
4,5,6	~~5.2.2~~	~~392~~	~~393~~	~~1~~	~~Example 5.22; right angle bend~~
4,5,6	5.3	393	402	9	Intro to Non-Newtonian fluids
4,5,6	~~5.3.3~~	~~402~~	~~414~~	~~12~~	~~Inelastic constitutive equations~~
4,5,6	~~5.3.4~~	~~414~~	~~418~~	~~4~~	~~Viscoelastic constitutive equations~~
4,5,6	6	429	430	1	Microscopic balance equations
4,5,6	~~6.1~~	~~430~~	~~440~~	~~10~~	~~derivation~~
4,5,6	6.1.3.2	441	442	1	Newtonian constitutive equation
4,5,6	~~6.1.4~~	~~442~~	~~445~~	~~3~~	~~Energy Balance~~
4,5,6	**6.2**	**445**	**446**	**1**	**Using microscopic balance equations**
4,5,6	**6.2.1**	**446**	**464**	**18**	**Solution methodology**
4,5,6	**6.2.2**	**464**	**472**	**8**	**Boundary conditions**
4,5,6	**6.2.3**	**472**	**485**	**13**	**Engineering quantities of interest**

4,5,6	6.3	485	486	1	Summary
4,5,6	7.1	494	540	46	Circular pipes
4,5,6	7.2	540	572	32	noncircular conduits
4,5,6	~~7.3~~	~~572~~	~~585~~	~~13~~	~~more complex internal floes~~
7	~~9.1~~	~~741~~	~~766~~	~~25~~	~~deriving macroscopic balance equations~~
7	**9.2**	**766**	**769**	**3**	**using macro momentum balance eqn**
7	9.2.1	769	772	~~3~~	macro balances: pressure
7	9.2.2	772	779	~~7~~	macro balances: flow rate
7	9.2.3	779	800	~~21~~	macro balances: valves and fittings (skip example 9.7)
7	~~9.2.4~~	~~800~~	~~823~~	~~23~~	~~macro balances Pumps~~
7	~~9.2.5~~	~~823~~	~~830~~	~~7~~	~~macro balances open channel flow~~
8	8	600	601	1	external flow intro
8	**8.1**	**601**	**604**	**3**	**flow around a sphere**
8	**8.1.1**	**604**	**622**	**18**	**creeping flow around a sphere**
8	8.1.2	622	628	6	noncreeping flow around a sphere
8	8.1.2.1	628	647	19	dimensional analysis flow around a sphere
8	8.1.2.2	647	650	3	flow patterns
8	~~8.1.2.3~~	~~560~~	~~673~~	~~113~~	~~potential flow~~
8	**8.2**	**673**	**678**	**5**	**boundary layers**
8	**8.2.1**	**678**	**696**	**18**	**laminar boundary layers**
8	8.2.2	696	705	9	turbulent boundary layers
8	8.2.3	705	718	13	flow past blunt objects
8	~~8.3~~	~~718~~	~~733~~	~~15~~	~~more complex external flows~~
8	10.1	838	840	2	redux: viscosity, drag, boundary layers
8	~~10.2~~	~~840~~	~~845~~	~~5~~	~~numerical solution methods~~
8	~~10.3~~	~~845~~	~~853~~	~~8~~	~~redux: laminar, turbulent flow~~
8	10.6	867	874	7	compressible flow and supersonic
8	10.7	874	875	1	summary