

ECE 558 - Project 4 Solutions

1. 60 MW peak load (one day study)

Cap Out	Cap Avail	Cum Prob	Time Interval	Prob Curtail (day)
0	100	1.000e+000	0.00	0.000e+000
10	90	3.303e-001	0.00	0.000e+000
20	80	2.721e-001	0.00	0.000e+000
30	70	1.671e-001	0.00	0.000e+000
40	60	9.978e-002	0.00	0.000e+000
50	50	2.836e-002	1.00	2.836e-002
60	40	1.347e-002	0.00	0.000e+000
70	30	7.255e-003	0.00	0.000e+000
80	20	1.014e-003	0.00	0.000e+000
90	10	5.120e-004	0.00	0.000e+000
100	0	4.096e-005	0.00	0.000e+000
				LOLE 2.836e-002

2. 230 MW installed capacity, 150 MW to 200 MW peak load at 70% load factor calculate LOLE's

a. 150 MW peak load

Cap Out	Cap Avail	Cum Prob	Time Interval	Prob Curtail (day)
0	230	1.000e+000	0.00	0.000e+000
40	190	5.393e-002	0.00	0.000e+000
50	180	3.967e-002	0.00	0.000e+000
60	170	2.036e-002	0.00	0.000e+000
70	160	1.057e-003	0.00	0.000e+000
80	150	1.057e-003	0.00	0.000e+000
90	140	9.852e-004	40.56	3.995e-002
100	130	6.941e-004	40.56	2.815e-002
110	120	4.031e-004	40.56	1.635e-002
120	110	9.020e-006	40.56	3.658e-004
130	100	8.900e-006	40.56	3.610e-004
140	90	7.438e-006	40.56	3.016e-004
150	80	5.975e-006	40.56	2.423e-004
160	70	3.480e-008	40.56	1.411e-006
170	60	3.480e-008	40.56	1.411e-006
180	50	3.235e-008	0.00	0.000e+000
190	40	2.990e-008	0.00	0.000e+000
				LOLE 8.572e-002

b. 160 MW peak load

Cap Out	Cap Avail	Cum Prob	Time Interval	Prob Curtail (day)
0	230	1.000e+000	0.00	0.000e+000
40	190	5.393e-002	0.00	0.000e+000
50	180	3.967e-002	0.00	0.000e+000
60	170	2.036e-002	0.00	0.000e+000
70	160	1.057e-003	0.00	0.000e+000
80	150	1.057e-003	38.02	4.018e-002
90	140	9.852e-004	38.02	3.746e-002
100	130	6.941e-004	38.02	2.639e-002
110	120	4.031e-004	38.02	1.532e-002
120	110	9.020e-006	38.02	3.430e-004
130	100	8.900e-006	38.02	3.384e-004
140	90	7.438e-006	38.02	2.828e-004
150	80	5.975e-006	38.02	2.272e-004
160	70	3.480e-008	38.02	1.323e-006
170	60	3.480e-008	22.81	7.939e-007
180	50	3.235e-008	0.00	0.000e+000
190	40	2.990e-008	0.00	0.000e+000
				LOLE 1.205e-001

c. 170 MW peak load

Cap Out	Cap Avail	Cum Prob	Time Interval	Prob Curtail (day)
0	230	1.000e+000	0.00	0.000e+000
40	190	5.393e-002	0.00	0.000e+000
50	180	3.967e-002	0.00	0.000e+000
60	170	2.036e-002	0.00	0.000e+000

70	160	1.057e-003	35.78	3.782e-002
80	150	1.057e-003	35.78	3.782e-002
90	140	9.852e-004	35.78	3.525e-002
100	130	6.941e-004	35.78	2.484e-002
110	120	4.031e-004	35.78	1.442e-002
120	110	9.020e-006	35.78	3.228e-004
130	100	8.900e-006	35.78	3.185e-004
140	90	7.438e-006	35.78	2.661e-004
150	80	5.975e-006	35.78	2.138e-004
160	70	3.480e-008	35.78	1.245e-006
170	60	3.480e-008	7.16	2.491e-007
180	50	3.235e-008	0.00	0.000e+000
190	40	2.990e-008	0.00	0.000e+000
				LOLE 1.513e-001

d. 180 MW peak load

Cap Out	Cap Avail	Cum Prob	Time Interval	Prob Curtail (day)
0	230	1.000e+000	0.00	0.000e+000
40	190	5.393e-002	0.00	0.000e+000
50	180	3.967e-002	0.00	0.000e+000
60	170	2.036e-002	33.80	6.882e-001
70	160	1.057e-003	33.80	3.572e-002
80	150	1.057e-003	33.80	3.572e-002
90	140	9.852e-004	33.80	3.330e-002
100	130	6.941e-004	33.80	2.346e-002
110	120	4.031e-004	33.80	1.362e-002
120	110	9.020e-006	33.80	3.049e-004
130	100	8.900e-006	33.80	3.008e-004
140	90	7.438e-006	33.80	2.514e-004
150	80	5.975e-006	33.80	2.019e-004
160	70	3.480e-008	27.04	9.409e-007
170	60	3.480e-008	0.00	0.000e+000
180	50	3.235e-008	0.00	0.000e+000
190	40	2.990e-008	0.00	0.000e+000
				LOLE 8.311e-001

e. 190 MW peak load

Cap Out	Cap Avail	Cum Prob	Time Interval	Prob Curtail (day)
0	230	1.000e+000	0.00	0.000e+000
40	190	5.393e-002	0.00	0.000e+000
50	180	3.967e-002	32.02	1.270e+000
60	170	2.036e-002	32.02	6.520e-001
70	160	1.057e-003	32.02	3.384e-002
80	150	1.057e-003	32.02	3.384e-002
90	140	9.852e-004	32.02	3.154e-002
100	130	6.941e-004	32.02	2.222e-002
110	120	4.031e-004	32.02	1.290e-002
120	110	9.020e-006	32.02	2.888e-004
130	100	8.900e-006	32.02	2.850e-004
140	90	7.438e-006	32.02	2.381e-004
150	80	5.975e-006	32.02	1.913e-004
160	70	3.480e-008	12.81	4.457e-007
170	60	3.480e-008	0.00	0.000e+000
180	50	3.235e-008	0.00	0.000e+000
190	40	2.990e-008	0.00	0.000e+000
				LOLE 2.058e+000

f. 200 MW peak load

Cap Out	Cap Avail	Cum Prob	Time Interval	Prob Curtail (day)
0	230	1.000e+000	0.00	0.000e+000
40	190	5.393e-002	30.42	1.640e+000
50	180	3.967e-002	30.42	1.207e+000
60	170	2.036e-002	30.42	6.194e-001
70	160	1.057e-003	30.42	3.215e-002
80	150	1.057e-003	30.42	3.215e-002
90	140	9.852e-004	30.42	2.997e-002
100	130	6.941e-004	30.42	2.111e-002
110	120	4.031e-004	30.42	1.226e-002
120	110	9.020e-006	30.42	2.744e-004

130	100	8.900e-006	30.42	2.707e-004
140	90	7.438e-006	30.42	2.262e-004
150	80	5.975e-006	30.42	1.817e-004
160	70	3.480e-008	0.00	0.000e+000
170	60	3.480e-008	0.00	0.000e+000
180	50	3.235e-008	0.00	0.000e+000
190	40	2.990e-008	0.00	0.000e+000
				LOLE 3.595e+000

3. 290 MW installed capacity, 200 MW to 260 MW peak load at 70% load factor
calculate LOLE's

a. 200 MW peak load

Cap Out	Cap Avail	Cum Prob	Time Interval	Prob Curtail (day)
0	290	1.000e+000	0.00	0.000e+000
40	250	7.286e-002	0.00	0.000e+000
50	240	5.888e-002	0.00	0.000e+000
60	230	3.996e-002	0.00	0.000e+000
70	220	2.114e-003	0.00	0.000e+000
80	210	2.114e-003	0.00	0.000e+000
90	200	2.044e-003	0.00	0.000e+000
100	190	1.759e-003	30.42	5.350e-002
110	180	1.188e-003	30.42	3.615e-002
120	170	4.161e-004	30.42	1.266e-002
130	160	2.986e-005	30.42	9.082e-004
140	150	2.843e-005	30.42	8.646e-004
150	140	2.556e-005	30.42	7.774e-004
160	130	1.392e-005	30.42	4.233e-004
170	120	8.095e-006	30.42	2.462e-004
180	110	2.121e-007	30.42	6.452e-006
190	100	2.073e-007	30.42	6.306e-006
200	90	1.488e-007	30.42	4.526e-006
210	80	1.195e-007	30.42	3.636e-006
				LOLE 1.055e-001

b. 210 MW peak load

Cap Out	Cap Avail	Cum Prob	Time Interval	Prob Curtail (day)
0	290	1.000e+000	0.00	0.000e+000
40	250	7.286e-002	0.00	0.000e+000
50	240	5.888e-002	0.00	0.000e+000
60	230	3.996e-002	0.00	0.000e+000
70	220	2.114e-003	0.00	0.000e+000
80	210	2.114e-003	0.00	0.000e+000
90	200	2.044e-003	28.97	5.922e-002
100	190	1.759e-003	28.97	5.095e-002
110	180	1.188e-003	28.97	3.443e-002
120	170	4.161e-004	28.97	1.205e-002
130	160	2.986e-005	28.97	8.650e-004
140	150	2.843e-005	28.97	8.234e-004
150	140	2.556e-005	28.97	7.404e-004
160	130	1.392e-005	28.97	4.031e-004
170	120	8.095e-006	28.97	2.345e-004
180	110	2.121e-007	28.97	6.144e-006
190	100	2.073e-007	28.97	6.005e-006
200	90	1.488e-007	28.97	4.311e-006
210	80	1.195e-007	17.38	2.078e-006
				LOLE 1.597e-001

c. 220 MW peak load

Cap Out	Cap Avail	Cum Prob	Time Interval	Prob Curtail (day)
0	290	1.000e+000	0.00	0.000e+000
40	250	7.286e-002	0.00	0.000e+000
50	240	5.888e-002	0.00	0.000e+000
60	230	3.996e-002	0.00	0.000e+000
70	220	2.114e-003	0.00	0.000e+000
80	210	2.114e-003	27.65	5.847e-002
90	200	2.044e-003	27.65	5.652e-002
100	190	1.759e-003	27.65	4.864e-002
110	180	1.188e-003	27.65	3.286e-002

120	170	4.161e-004	27.65	1.151e-002
130	160	2.986e-005	27.65	8.257e-004
140	150	2.843e-005	27.65	7.860e-004
150	140	2.556e-005	27.65	7.067e-004
160	130	1.392e-005	27.65	3.848e-004
170	120	8.095e-006	27.65	2.238e-004
180	110	2.121e-007	27.65	5.865e-006
190	100	2.073e-007	27.65	5.732e-006
200	90	1.488e-007	27.65	4.115e-006
210	80	1.195e-007	5.53	6.611e-007
				LOLE 2.109e-001

d. 230 MW peak load

Cap Out	Cap Avail	Cum Prob	Time Interval	Prob Curtail (day)
0	290	1.000e+000	0.00	0.000e+000
40	250	7.286e-002	0.00	0.000e+000
50	240	5.888e-002	0.00	0.000e+000
60	230	3.996e-002	0.00	0.000e+000
70	220	2.114e-003	26.45	5.592e-002
80	210	2.114e-003	26.45	5.592e-002
90	200	2.044e-003	26.45	5.407e-002
100	190	1.759e-003	26.45	4.652e-002
110	180	1.188e-003	26.45	3.143e-002
120	170	4.161e-004	26.45	1.101e-002
130	160	2.986e-005	26.45	7.898e-004
140	150	2.843e-005	26.45	7.518e-004
150	140	2.556e-005	26.45	6.760e-004
160	130	1.392e-005	26.45	3.681e-004
170	120	8.095e-006	26.45	2.141e-004
180	110	2.121e-007	26.45	5.610e-006
190	100	2.073e-007	26.45	5.483e-006
200	90	1.488e-007	21.16	3.149e-006
210	80	1.195e-007	0.00	0.000e+000
				LOLE 2.577e-001

e. 240 MW peak load

Cap Out	Cap Avail	Cum Prob	Time Interval	Prob Curtail (day)
0	290	1.000e+000	0.00	0.000e+000
40	250	7.286e-002	0.00	0.000e+000
50	240	5.888e-002	0.00	0.000e+000
60	230	3.996e-002	25.35	1.013e+000
70	220	2.114e-003	25.35	5.359e-002
80	210	2.114e-003	25.35	5.359e-002
90	200	2.044e-003	25.35	5.181e-002
100	190	1.759e-003	25.35	4.458e-002
110	180	1.188e-003	25.35	3.012e-002
120	170	4.161e-004	25.35	1.055e-002
130	160	2.986e-005	25.35	7.569e-004
140	150	2.843e-005	25.35	7.205e-004
150	140	2.556e-005	25.35	6.479e-004
160	130	1.392e-005	25.35	3.527e-004
170	120	8.095e-006	25.35	2.052e-004
180	110	2.121e-007	25.35	5.376e-006
190	100	2.073e-007	25.35	5.255e-006
200	90	1.488e-007	10.14	1.509e-006
210	80	1.195e-007	0.00	0.000e+000
				LOLE 1.260e+000

f. 250 MW peak load

Cap Out	Cap Avail	Cum Prob	Time Interval	Prob Curtail (day)
0	290	1.000e+000	0.00	0.000e+000
40	250	7.286e-002	0.00	0.000e+000
50	240	5.888e-002	24.33	1.433e+000
60	230	3.996e-002	24.33	9.723e-001
70	220	2.114e-003	24.33	5.145e-002
80	210	2.114e-003	24.33	5.145e-002
90	200	2.044e-003	24.33	4.974e-002
100	190	1.759e-003	24.33	4.280e-002
110	180	1.188e-003	24.33	2.892e-002

120	170	4.161e-004	24.33	1.013e-002
130	160	2.986e-005	24.33	7.266e-004
140	150	2.843e-005	24.33	6.917e-004
150	140	2.556e-005	24.33	6.219e-004
160	130	1.392e-005	24.33	3.386e-004
170	120	8.095e-006	24.33	1.970e-004
180	110	2.121e-007	24.33	5.161e-006
190	100	2.073e-007	24.33	5.044e-006
200	90	1.488e-007	0.00	8.458e-021
210	80	1.195e-007	0.00	0.000e+000
				LOLE 2.642e+000

g. 260 MW peak load

Cap Out	Cap Avail	Cum Prob	Time Interval	Prob Curtail (day)
0	290	1.000e+000	0.00	0.000e+000
40	250	7.286e-002	23.40	1.705e+000
50	240	5.888e-002	23.40	1.378e+000
60	230	3.996e-002	23.40	9.349e-001
70	220	2.114e-003	23.40	4.947e-002
80	210	2.114e-003	23.40	4.947e-002
90	200	2.044e-003	23.40	4.783e-002
100	190	1.759e-003	23.40	4.115e-002
110	180	1.188e-003	23.40	2.781e-002
120	170	4.161e-004	23.40	9.736e-003
130	160	2.986e-005	23.40	6.986e-004
140	150	2.843e-005	23.40	6.651e-004
150	140	2.556e-005	23.40	5.980e-004
160	130	1.392e-005	23.40	3.256e-004
170	120	8.095e-006	23.40	1.894e-004
180	110	2.121e-007	23.40	4.963e-006
190	100	2.073e-007	14.04	2.910e-006
200	90	1.488e-007	0.00	0.000e+000
210	80	1.195e-007	0.00	0.000e+000
				LOLE 4.245e+000