Substrate: Rogers RO4003C, 31 mil thick, ½ oz copper (17 µm)

**Filter specifications:**

|  |  |  |
| --- | --- | --- |
| **Name** | **Center Frequency** | **Ripple bandwidth** |
| Hamed | 3 GHz | 0.3 GHz |
| Matthew | 3.2 GHz | 0.28 GHz |
| Shadman | 3.4 GHz | 0.26 GHz |
| Youssef | 3.6 GHz | 0.24 GHz |
| Niteesh | 3.8 GHz | 0.22 GHz |

Resonator structure: hair pin

Number of filtering orders: 4

S11 in the ripple bandwidth: < -15 dB

**Judging criteria:**

1. Resonator simulation results: 10%
2. Filter synthesis (k and Qext): 20%
3. Simulation of internal coupling coefficients: 20%
4. Simulation of external coupling coefficients: 20%
5. Filter tuning and measurement results: 30%

Every student in EEL5437C is expected to design, fabricate and measure your own filter. The filter layout is due at midnight 12/8/2023 and should be sent to the lab instructor Ectis Velazquez. He will fabricate and measure the filters on 12/9/2023. All EEL5437C students need to join him in the filter fabrication in the teaching lab. You can be involved as much as you want in the fabrication and measurement. A final report is due on 12/10/2023 at midnight.

**Suggested timeline for project progress:** (you should have a working document when you design your filter)

1. Simulate the resonator **by 11/15/2023**
2. Synthesize the filter k and Qext **by 11/22/2023**
3. Simulate k and Qext in HFSS **by 11/29/2023**
4. Tune the filter performance **by** **12/8/2023**
5. Fabricate and measure the filter **on** **12/9/2023**
6. Finalize the project report **on** **12/10/2023**

The project report should contain:

1. Design specifications and your design tradeoff justifications

2. Filter synthesis procedure, tuning and related simulation results

3. Filter final layout and simulation results

4. Fabrication and measurement results

5. Comments and Conclusions