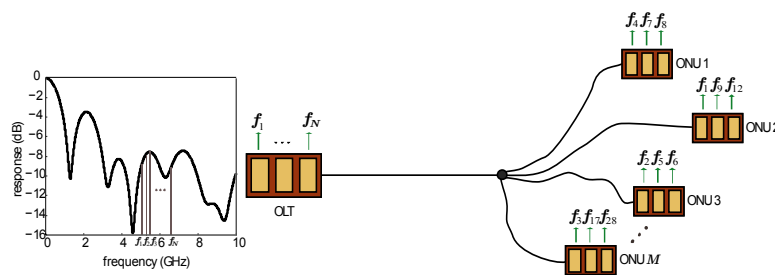


## Master assignment EWI - DACS

### Network protocol for multimode FTTH/FTTB

To accelerate the deployment of broadband access networks, several access network types are being proposed which should provide adequate capacity to handle multiple services for a reasonable number of users while at the same time having relatively low deployment cost. Among these, one of the promising solutions is the fiber-to-the-home (FTTH) / fiber-to-the building (FTTB) solution based on passive optical network (PON) which utilizes multimode fiber as the transmission medium. For this network, multicarrier multiplexing using higher-order lobes of the multimode fiber frequency response is envisioned as the transmission method to overcome the baseband capacity limitation of the multimode fiber.



An illustration of a multicarrier multimode PON.

In an earlier work, a centralized subcarrier assignment method has been developed which exploits multiuser diversity aspect of the network and adapts to the network loads. Related to this, some simulation codes (on OPNET platform) have been developed to assess some performance aspects of the subcarrier assignment method.

The goal of this assignment is to design a link-layer protocol (as the network is single-hop) which uses the previously developed subcarrier assignment method as its core algorithm. The protocol may use out-of-band signaling through the baseband channel of the multimode fiber. Also, the network setup and join/leave procedures should be devised as parts of the protocol.

In particular, the following steps should be covered:

- By literature research, study the existing related network protocols.
- Design a suitable network protocol for the above-mentioned access network.
- Get familiarized with OPNET.
- Develop simulation codes for the proposed protocol.
- Perform simulations incorporating the previously developed subcarrier assignment method to assess the network performance.

For more information, please contact Robert Taniman ([r.o.taniman@ewi.utwente.nl](mailto:r.o.taniman@ewi.utwente.nl), Zi-5013).